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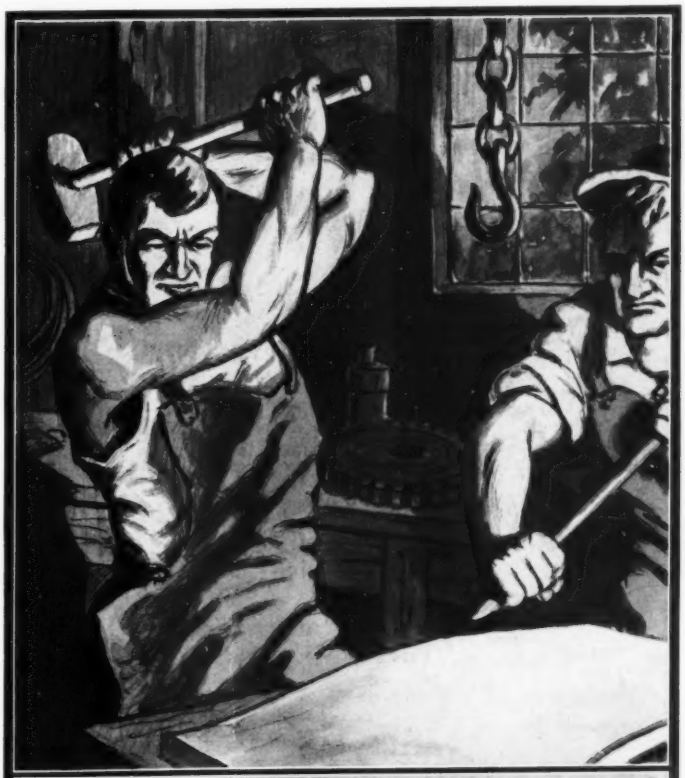
THE INDUSTRIAL-ARTS MAGAZINE



OCTOBER-1929

THE BRUCE PUBLISHING COMPANY

NEW YORK MILWAUKEE CHICAGO

ATKINS SILVER STEEL SAWS

ATKINS HELPS FOR THE SHOP TEACHER IN WOODWORKING

This Saw Will Be Loaned for Eight Weeks

To assist the teacher who is looking for approved and scientific methods of teaching the use and care of *THE SAW*, ATKINS will loan for eight weeks, the SPECIAL *Demonstration Saw* pictured here.

There is no charge for this help; simply write our Indianapolis factory, using your school stationery, requesting the saw with two handles — Atkins New Improved Perfection, and the old style Block Handle, **giving us your dealer's name.**

YOU WILL BE PLEASED

If you are not using the World famous brands of "SILVER STEEL" Hand, Rip, and Panel Saws, you will be surprised and pleased at the wonderful results you can obtain from a trial of these Modern fast cutting, easy running saws. Give them a trial.

GET THESE BOOKS FREE

Saw Sense illustrates many popular patterns of Atkins Saws and explains roof framing, shingling, care of saws, etc. Can be had for your entire class.

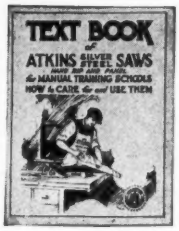
SEE OUR DATA IN BRUCE'S SPECIFICATION ANNUAL 1929 EDITION

"A Perfect Saw For Every Purpose"

Instructors are invited to ask for

ATKINS LATEST CATALOG.

Atkins New Free Text Book contains valuable information for all those interested in saws and sawing. One to each teacher.



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VOL. XVIII
No. 10

INDUSTRIAL-ARTS MAGAZINE

OCTOBER,
1929

Published Monthly by

THE BRUCE PUBLISHING CO.

Eastern Office:
342 MADISON AVE.
NEW YORK, N. Y.

354-364 MILWAUKEE STREET
MILWAUKEE, WIS.

Western Office:
66 E. SOUTH WATER ST.
CHICAGO, ILL.

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TO THE TEACHER

Welcome back to your duties. May the school year 1929–1930 help you reach the goal which you have set for yourself.

INDUSTRIAL-ARTS NEWS

The new school year has just begun. There may have been changes in your shops, equipment, courses, and personnel. Send in your news items about these changes so that all may learn of the progress that your school is making.

THIS MONTH'S POSTERS

Make use of Posters 3 and 4 on your bulletin board this month. You will find them on pages 391 and 392 of this issue.

(The articles contained in the Magazine are regularly indexed in "The Reader's Guide to Periodical Literature," "Education Index," and "Current Magazine Contents."

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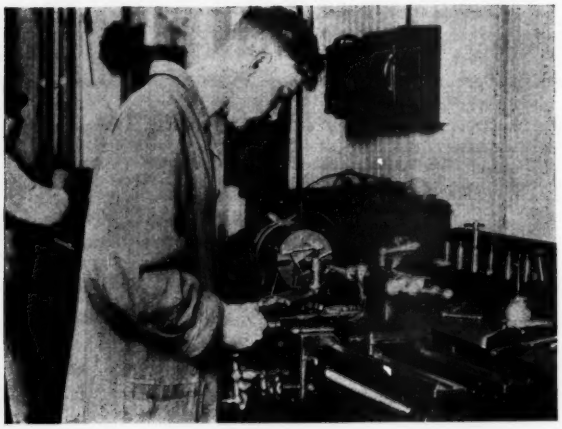
Subscription Information—Subscription price, $2.50 per year, payable in advance. Canadian and Mexican postage, 35 cents, foreign countries, 50 cents. Copies not over three months old, 25 cents; more than three months, 50 cents. Notices for discontinuance of subscription must reach Publication Office in Milwaukee, at least fifteen days before date of expiration. Changes of address should invariably include old as well as new address. Complaint of non-receipt of subscribers' copies cannot be honored unless made within fifteen days after date of issue.

Editorial Contributions—The Editors invite contributions bearing uopn Industrial-Arts, Vocational Education, Manual Training, and related subjects. Manuscripts, drawings, projects, news, etc., should be sent to the Publication Office in Milwaukee. Contributions are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

The Magazine is on sale at Brentano's, New York; Wanamaker's, Philadelphia; Brentano's, Chicago; Philippine Education Co., Manila, P. I.

When this boy leaves school –



The chances are about two to one he will continue to use a STAR lathe

He is learning now to use the same machines he will later find in industrial life. He is receiving training which will make the transition from school to shop natural and easy—and he is going to find himself 'way ahead of less fortunate boys who did not have the same opportunity to learn to use real production equipment during their school days.

. . . When **this** boy leaves school, he's going to "know his stuff" and he's going to tackle his job with the confidence that means half the battle.

The boy who learns to use a Seneca Falls STAR lathe not only learns to use a machine of real production type, but gains actual experience on the same machine which he will be most likely to use in later life. For STAR lathes have long been the choice of skilled mechanics wherever precision lathes are required and where accurate work of medium size is essential. By choosing STAR lathes for your school shop, you are confirming the judgment of experienced manufacturers and are providing the finest of educational equipment.

Write for a copy of the interesting booklet "Star Witnesses"

SENECA FALLS MACHINE CO.

SENECA FALLS - - - - NEW YORK

THE INDUSTRIAL-ARTS MAGAZINE

Volume XVIII OCTOBER, 1929 Number 10

Promoting Evening Classes

John R. Patlow, Supervisor of Industrial Education, Lincoln, Nebraska

IF we accept the principle that education is an investment made by the state to preserve and promote its own best interests, we must conclude that an educational system should be organized to meet the particular needs of people with many varying degrees of interests, aptitudes, and skills. These needs are constantly changing. For example, the automobile has completely revolutionized our means of transportation and ways of living. The needs growing out of these changes are being met through the manufacture of automobiles with a varying range of price specifications which consider such factors as economy, size, comfort, speed, performance, and utility. In like manner, schools must meet present-day demands by making proper modifications in their educational programs.

School systems are organizing along broader lines and include not only the academic program of the full-time day school, but also provisions to meet the needs of those who are planning to enter the vocations, as well as those who are already in industry. The American public-school system is fast becoming a service institution that provides an opportunity to continue and improve one's preparation in practically any vocation and at any age. Truly, this is a step in the direction of not only meeting the needs of all the children of all the people, but also the needs of those who are beyond the youthful school age.

NIGHT SCHOOL
for
ADULTS

Persons over 16 years of age not in day school

MONDAYS TUESDAYS WEDNESDAYS

7:00 to 9:00 p.m.

Morning and Afternoon Classes on Demand

MONDAY, OCTOBER 15TH

CLASSES IN

Trades and Industries
Printing
Plumbing
Electricity
Telephony
Nursing (Hospital)
Auto Mechanics
Railroad Mechanics
Building Construction
Custodial Management

Citizenship
English for Foreigners
Common Branches

Homemaking
Mother Training
Child Care
Home Care of Health
Foods
Home Decoration
Nutrition
Dressmaking
Remodeling Garments

Commercial Courses
Salesmanship
Bookkeeping
Shorthand
Typewriting

SCHOOL CENTERS

LINCOLN HIGH, 22nd and J Streets
PARK, 8th and F Streets
BANCROFT, 14th and Vine
LONGFELLOW, 1st and J Streets
HAYWARD, 9th and Z Streets

For Details Phone B-6991

Board of Education Office 15th and M Streets

TUITION FREE TO RESIDENTS

FIG. 1

Plan of Organization

In this age of highly organized competition and quantity production, industry is making more exacting applications of scientific principles in order to improve quality. This, of course, requires better-trained workers, and the public evening school has a definite service to perform in the training of these workers.

In the Lincoln program, evening-school instruction is offered in the trades and industries, adult homemaking, citizenship, and commercial fields. The various courses are listed on the poster shown in Figure 1. These courses also are offered mornings and afternoons at a central school, in numerous neighborhood schools, and in business buildings and industrial establishments.

The instruction is offered on the basis that it has a direct application to the daily employment in terms of immediate and measurable results. Students who attend evening school come with varying degrees of preparation in the "how to do" which is concerned with the operations, such as are involved in working with tools, machines, and materials. There is the same diversity of preparation in the "why and what" or the related information such as applied mathematics, plan reading, specifications and equipment. This condition makes it necessary to offer a wide range of courses to meet the individual needs of the students.

Promoting the Evening School

Setting the necessary machinery into motion to start the evening school is an essential factor in the development of a successful evening-school program. It is the business of the schools to promote educational programs in the same degree that department stores, auto dealers, and other organizations, promote sales and community drives. The evening-school courses must be interpreted to the people who are most likely to be interested, such as manufacturing and labor groups, commercial employees, and prospective and present

homemakers. It may be well to mention that the students in the full-time day schools should be taught to think of the evening school as a place to continue their training after they enter upon employment.

Methods of Promotion

Since evening-school instruction is on a voluntary basis, it naturally requires promotional activities of various kinds. Among them are (1) personal contacts, (2) advertising, and (3) efficient instruction. All three of these factors are dependent upon each other in selling a city-wide evening-school program.

Promotion Through Personal Contacts

One of the effective methods of conducting promotional work is through personal contacts. The classified sections in the telephone and city directories are valuable aids in determining what industries, labor unions, trade organizations, and other groups, might be interested in some special phase of evening-school work.

1. *Making the Contact*

After the special fields in which courses might be offered have been determined, individual appointments can be arranged with persons in responsible positions, such as the master mechanic of a railroad, the business agent of a labor union, the plant superintendent of a telephone company, the production manager of a manufacturing plant, the superintendent of nurses at a hospital, the secretary of the manufacturers' association, and others in like capacities. It is very important to make these contacts with persons in key positions in order to accomplish the desired results and eliminate the loss of time and energy.

2. *Presenting the Program to Industrial Concerns, Labor Unions, and Trade Organizations*

a) Executives

The presentation of the entire evening-school program should be taken up with the individuals representing the organization. Such persons are interested in the courses to be offered, other plants or groups taking such courses, numbers enrolled, qualifications of teachers, training of teachers, cost of instruction, length of courses, organization of classes through educational committees and foreman groups, plant employee meetings, and other items of interest pertaining to the program. The outcome of the presentation of the above facts should be the formation of an educational committee.

b) Committee on Education

After the educational committee or foreman group in charge of education has been decided upon, it is highly desirable for the local supervisor of the city schools to explain the points as mentioned above to this group also. Since the members of this group are in immediate contact with the men on the job, they should be given a considerable amount of responsibility in promoting and selling the idea to the employees in the plant or labor union.

c) Plant Employees

As soon as the foundational work is laid, arrangements are in order to present the program to the employees of the particular plant or group. Illustrative material in the form of pictures, kinds of work done by former students, advancement as a result of taking evening-school instruction, are devices that have a stimulating effect in selling the program. Handbills and enrollment blanks should be available at the meeting and points in question should be discussed and clarified.

3. *Other Organizations*

a) Civic Clubs

It is natural for employees and employers to become actively interested in a proposition of this kind since they are to receive immediate and mutual benefits from the instruction in doing a better piece of work on the job. Civic organizations as a whole can be depended upon to manifest a general interest in the evening-school program because of the diversity of interests in the membership of the clubs.

b) The Public Schools

In Lincoln, the superintendent of schools holds monthly meetings which are attended by all school principals, supervisors, and directors. These meetings are a worth-while and important means to use to integrate the school personnel on the evening-school program.

The following are suggestive of points which can be considered in a meeting of this type:

1. Purpose of adult education.
2. Its relation to the entire educational program.
3. The relation of the principal to adult education.
4. Cost of evening-school instruction.
5. Promotion of classes through the parent-teacher association and pupils.
6. Subjects offered in adult education.

The above topics are only suggestive as an aid in promoting this work. Adult homemaking classes are best promoted through the principal in the neighborhood school working in conjunction with the parent-teacher associations. The children play a very prominent part in this promotion, because they can take the necessary information dealing with the evening school into their homes.

Promotion Through Advertising

Promotion should utilize as many means of advertising as possible. The advertising should begin shortly after the regular schools open in September.

1. *Posters*

Posters may be distributed and placed in the display windows of business firms, and also posted on the bulletin boards and in other conspicuous places in the industrial plants, employment offices, and labor-union halls. The important items of interest on a poster of

POWER-EQUIPMENT CLASS IN TELEPHONY

BURLINGTON RAILWAY EMPLOYEES
Evening School Begins
Monday, October 15th
at
LINCOLN HIGH SCHOOL
BURLINGTON ROUNDHOUSE AND DEPOT

Air Brakes.
Air-brake operation, air compressors, feed valves, brake valves, reducing valves, air-signal valves, etc.
Monday and Wednesday, Burlington Roundhouse.

Blue-Print Reading.
Dimensions, symbols, projection of views, sections, gears, etc.
L.H.S. Monday and Wednesday, Room 140.

Valve Setting.
Port marks, valves, bushings, Walschart gear, etc.
Tuesday and Thursday, Burlington Roundhouse.

American Railway Association Rules.
Rough handling, couplers, yokes and draft gear, air and brake rigging, welding, patching wheel and axle defects, improper repairs, safety appliances, and grab irons.
Tuesday and Thursday, Burlington Depot.

Shoes and Wedges.
Laying out.

Written Orders.
Railroad letter writing, blanks, orders, reports, requisitions, etc.

For Details
Phone B—6991 Board of Education Office, 15th and M Streets
Tuition Free to Resident Persons

FIG. 2

EDUCATION FOR ADULTS
Persons over 16 years of age, not in day school
Monday, October 18th
Mondays *Tuesdays* *Wednesdays*
7:00 to 9:00 p.m.
Morning and Afternoon Classes on Demand

School Centers

Saratoga	13th and Saratoga	McKinley	15th and M Streets
Clinton	29th and Holdredge	Park School	8th and F Streets
Whittier	23rd and Vine	Longfellow	1st and J Streets
Bancroft	14th and Vine	Hayward	9th and Z Streets
High School	22nd and J		

Classes in Trades and Industries

Auto Mechanics
Auto Electricity
Auto Repair
Barbering
Barber-Shop Management
Skin Diseases
Care of Skin and Scalp
Building Construction
The Steel Square
Plan Reading and Specifications
Architectural Drafting
Custodial Management
Fuel and Combustion
Heating and Ventilating
Decorating
Painting
Wallpapering
Machine Trades
Blue-Print Reading
Electricity
Shop Mathematics
Code Rules and Ordinances
Plans and Specifications
Plumbing
Sketching and Layouts
Plumbers Code
Lead Work
Printing
Printers English
Typographical Design
Inks and Paper
Estimating
Nursing (Hospital)
Chemistry
Psychology
Bacteriology
Dietetics
Homemaking Courses
Clothing
Millinery
Sewing
Dressmaking
Remodeling Garments
Foods
Supper Class, 6:15-8:15 p.m.
Meal Planning
Nutrition (not a laboratory class)
Health
Care of skin and hair
Home nursing
Home Decoration
Mother Training
Commercial Courses
English for Foreigners
Common Branches
Citizenship

For Details
Phone B—6885—Board of Education Office, 15th and N Streets
Ask for Director of Extension Education.
Tuition Free to Resident Persons

FIG. 4

BUILDING TRADES EMPLOYEES
Evening School Begins
Monday, October 15th
7:00 to 9:00 p.m.
at
LINCOLN HIGH SCHOOL

Architectual Drawing, Beginners
Reading of blue prints, lettering and dimensioning of drawings, inking and tracing, bonds in brickwork, types of masonry, window and door details, wall sections, cornice construction, stair work; fire-place construction, etc.
Tuesday and Wednesday, Room 132.

Architectual Drawing, Advanced
Planning a brick veneer or stucco residence.
Drawings of details, sections, plans, elevations and perspectives.
Orders of architecture.
Tuesday and Wednesday, Room 132.

Blue-Print Reading for Builders
Plans, room sizes, walls, interior details, fixture, elevations, and exterior details.
Tuesday and Wednesday, Room 134.

Building Estimating
Excavations, concrete, brickwork, lumber, roofing, sheet metal, millwork, lath and plaster, hardware, and labor.
Tuesday and Wednesday, Room 134.

Plumbing
Joint wiping, pipe bending, layouts and estimating for apprentices and journeyman.
Monday and Wednesdays, Room 130.

Roof Framing
Roof construction, cornices, stairways, and intricate mitered parts for carpenters and interior wood finishers.
Tuesday and Wednesday, Room 143.

ADDITIONAL COURSES

Auto Mechanics	Dressmaking
Architectural Drafting	Home Decoration
Barbering	Home Nursing
Blue-Print Reading	Meal Planning
Custodial Management	Millinery
Electricity	Mother Training
Fuel and Combustion	Nutrition
Nursing (Hospital)	Remodeling Garments
Plumbing	Commercial Courses
Printing	English for Foreigners
Citizenship	Common Branches

For Details
Phone B—6991 Board of Education Office, 15th and M Streets
Tuition Free to Resident Persons

FIG. 3

this type are: courses offered, school centers, place, time and days of meetings, and source of additional information. (See Fig. 1.)

2. *Handbills*

Handbills can be divided into two types; namely, (1) those which are distributed through the schools by the pupils and contain the general information concerning all of the courses, and (2) the type which give the detailed information on the type courses in the special fields, such as the building trades, telephony, railroading and others. (See Figs. 2, 3, and 4.)

AN EVENING CLASS IN LEADWORK FOR PLUMBERS

LINCOLN PUBLIC SCHOOLS
Department of Extension Education
Trades and Industries Division

The Lincoln public schools are prepared to offer instruction to employees of the Cushman Motor Works. Instruction is free. Classes will be held at a time which is convenient to the group. Please fill out the form and return to your foreman. The classes may be arranged to meet one or two evenings a week for ten weeks.

Check Here	*Classes*	*Where Held*
	Blue-Print Reading	Cushman Motors
	Mathematics for Machinists	Cushman Motors
	Drafting for Machinists	Cushman Motors
	Machine-Shop Practice	Univ. of Nebr. Machine Shop

Check day, or days, that you can attend class from 7 to 9 p.m.
Monday.... Tuesday.... Wednesday.... Thursday.... Friday....
Name..... Address..... Tel.....

FIG. 5

LINCOLN PUBLIC SCHOOLS
Department of Extension Education
Trades and Industries Division

The Lincoln public schools are prepared to offer instruction to men in industrial plants of the city. There is no cost involved in the instruction. Classes can be held at the time which is convenient to the group. In view of this fact, you are asked to fill out the following questionnaire and return it to your foreman.

Check Here	*Name of Subject*
	Laying out millwork.
	Operation of millwork machines.
	Stair building.
	Shop arithmetic for woodworkers.
	Blue-print reading.
	Reading specifications for estimations.

Check day that you could attend class between 7 and 9 p.m.
Monday.... Tuesday.... Wednesday.... Thursday.... Friday....
Name..... Address ..... Tel.....

FIG. 6

LINCOLN PUBLIC SCHOOLS
Department of Extension Education
Trades and Industries Division

The Lincoln public schools are prepared to offer instruction to employees of the C. B. & Q. railroad. Instruction is free. Classes shall be held at a time which is convenient to the group. Please fill out the form and return to your foreman. The classes may be arranged to meet one or two evenings a week for ten weeks.

Check Here	*Classes*	*Where Held*
	Blue-Print Reading for Machinists	Lincoln High School
		Roundhouse
	Air Brakes	Burlington Depot
	American Railway Rules	

Check day, or days, that you can attend class from 7 to 9 p.m.
Monday.... Tuesday.... Wednesday.... Thursday.... Friday....
Name..... Address ..... Tel.....

FIG. 7

LINCOLN PUBLIC SCHOOLS
Department of Extension Education
Trades and Industries Division

Plumbers of Lincoln:

The Lincoln city schools will offer a course in the new Plumbing Ordinance No. 2993, beginning October 15. The instruction is to deal with discussions on the various sections in the ordinance. The meetings are to be held in the Lincoln high school addition, Room 130. The class will meet on Monday and Wednesday evenings from 7 to 9 p. m. The instruction is free to residents of the City of Lincoln.

You are cordially invited to attend.

Sincerely yours,
J. R. PATLOW,
Supervisor, Industrial Education.

P. S. Please post this letter in your shop.

FIG. 8

LINCOLN PUBLIC SCHOOLS PAINTERS' AND PAPERHANGERS' SCHOOL
at 1721 SOUTH 27TH STREET

The Lincoln public schools will conduct a school for the decorating trades, beginning December 14, meeting on Tuesday and Thursday evenings, from 7:15 to 9:15 p.m.

WALLPAPER DECORATIONS — COURSE ONE

Preparation of Surfaces	This will include a consideration of the preparation of all surfaces to be papered, including the removal of kalsomine, paint and paper, sizing, treatment of sand-finished walls, wall boards, and the application of cloth to wood surfaces.
Hanging Paper	This will include the selection, matching, posting, and trimming the various kinds of papers, and the hanging of plain papers, bedroom stripes, burlaps, canvas, florals, geometrics, bands and borders, lincrusta, leathers and heavy-pressed papers, grass cloth, cheviots and velours.

PAINT DECORATION — COURSE TWO

Color	Theory of light and color, color harmony and color mixing. This will include a consideration of the value of primary and secondary colors, and practical work in color mixing on the part of each student. Problems in color harmony will also be presented.
Preparation of Surfaces	This will include a study of the chemical treatment of old and new surfaces preparatory to the application of paint, the finishing and refinishing of woodwork, chemical tests for adulterants in paint materials. This work will solve many troublesome problems for painters.
Stains	Both oil and chemical stains will be considered. Ample opportunity will be provided for making and testing the chemical stains.
Marbling	This will be offered for persons desiring it.
Graining	For those who request it, oak, mahogany, and walnut graining will be given.
	Instruction will be devoted to a consideration of stippling, mottling, blending, stencil design, stencil cutting, stenciling, tapestry effects, and free-hand decoration.

PRACTICAL WORK

From one to two hours will be devoted daily to lecture, discussion, and question box. The balance of the time will be devoted to practical work on the part of all men.

TOOLS NEEDED

Paint Unit	Each man taking the paint unit will need to furnish his own wall, stencil, stippling, and pencil brushes, overalls, old rags, and paint pails.
Paper-Hanging Unit	Each man will need a paste table, paste pail, straightedge, paste brush, trimming knife, shears, plumb bob, chalk line, rollers, and overalls.
Materials	Through the courtesy of the Wallpaper Manufacturers' Association, the Huron Mills, the Nebraska Paint Manufacturers and Dealers, the materials will be furnished free of charge.
Enrollment	Men may enroll for the paint unit, the paper decoration unit, or for both.
Who May Enroll	All apprentices, journeymen, or persons directly connected with the paint business, or young men who have made arrangements to enter the painting or paper-hanging trades as apprentices are eligible for enrollment.
Instruction Fitted to Individual Needs	The instruction will be largely upon an individual basis, and suited to the needs of journeymen of years of experience, as well as to apprentices.
Instructors	The instructors for each unit are specialists in their particular field—the best men available. It is planned to use a different instructor for each type of work; in this way expert instruction can be provided.
Certificates	A certificate will be issued to all men who attend and do satisfactory work for 75 per cent of the time of the unit.
How to Enroll	Persons desiring to enroll should communicate with: J. R. Patlow, Supervisor of Industrial Education, Board of Education, B-6991

FIG. 9

LINCOLN PUBLIC SCHOOLS

Evening Course in Custodial Management

The Lincoln public schools, in cooperation with the State Board of Vocational Education, are planning to conduct an evening course in Custodial Management for custodians, firemen, and engineers.

The course will be about twenty weeks in length, meeting one or two times a week from 7 to 9 p.m., on Monday, Tuesday, or Wednesday evenings. The work will consist of discussions and practical work of the every-day problems in custodial management.

It will be possible to attend class and to receive instruction in the phase of work that will meet the needs and abilities of each individual.

Suggested outline of the course:

I. Principles of Heating
- A. Types
  - 1. Steam heat
  - 2. Hot-water heat
  - 3. Hot-air heat
- B. Temperatures
  - 1. Offices and stores
  - 2. Schoolrooms
  - 3. Apartment houses
  - 4. Health and colds

II. Principles of Ventilating
- A. Types
  - 1. Fan
  - 2. Gravity
  - 3. Combination
  - 4. Window
- B. Amount and Kind of Air
  - 1. Humidity
  - 2. Recirculation
  - 3. Drafts

III. Sweeping and Cleaning
- 1. Compounds
- 2. Brooms and brushes
- 3. Sanitation

IV. Mechanical Phases
- 1. Repair of parts and equipment
- 2. Recording instruments

V. Social Contacts
- 1. Children at school
- 2. Public at large
- 3. Dignity of labor
- 4. Courtesy

VI. Combustion
- 1. Kinds of fuel
- 2. Drafts

Instruction and use of school buildings are free to the residents of the Lincoln districts, but the members of the class will pay for materials used.

A short-course certificate will be issued by the State Board of Vocational Education to those completing the course.

The first meeting is set for Tuesday evening, November 24, at 7:30 p.m., in the Center McKinley building. All men interested are invited to come to this meeting.

For further information call the Board of Education office, B-6991.

FIG. 10

Lincoln Public Schools
EVENING CLASSES
in
TRADES AND INDUSTRIES
HOMEMAKING
COMMERCIAL
Begin October 15
Call Board of Education

FIG. 11

3. *Circular Letters*

A considerable amount of interest can be stimulated in new courses by sending out circular letters to former students and special groups such as firemen, custodians, auto mechanics, plumbers, machinists, and others. Contractors should also receive these circular letters with a request that they be posted in a conspicuous place in the shop. (See Figs. 5, 6, 7, 8, 9, and 10.)

4. *Movie Slides*

By providing each theater with a slide, it is possible to give the general information on the evening-school program to the entire theater-going population. These slides can be made up by typing the necessary information on a "radio mat," which can be purchased at a photography supply house. This is a transparent film held between two carbon sheets from which the impression is made. After this typing is done, the carbon sheets are removed and the film placed between two pieces of glass. (See Fig. 11.)

EDUCATION FOR ADULTS

Persons over sixteen years of age, not in day school

Monday, October 18

Mondays Tuesdays Wednesdays

7:00 to 9:00 p.m.

Morning and Afternoon Classes on Demand

School Centers

Saratoga	13th and Saratoga	McKinley	15th and M Streets
Clinton	29th and Holdredge	Park School	8th and F Streets
Whittier	23rd and Vine	Longfellow	1st and J Streets
Bancroft	14th and Vine	Hayward	9th and Z Streets
High School	22nd and J		

Other Centers May Be Opened if There is Sufficient Demand

Classes in Trades and Industries	Homemaking Courses
Auto Mechanics	Clothing
Barbering	Foods
Building Construction	Health
Custodial Management	Home Decoration
Decorating	Mother Training
Machine Trades	**Commercial Courses**
Electricity	**English for Foreigners**
Plumbing	**Common Branches**
Printing	**Citizenship Classes**
Nursing (Hospital)	

For Details Phone—B-6885 Board of Education Office, 15th and N Streets
Ask for Director of Extension Education
Tuition Free to Resident Persons

FIG. 12

5. *Newspaper Publicity*

Publicity through the medium of the newspapers, labor organs, plant news, and school news, serves a very distinctive purpose. Such publicity should be run continuously for several weeks before the evening schools begin. Interviews and visits to evening classes by the reporters should be encouraged for the purpose of continuing the necessary publicity through items of special interest and feature story articles. (See Fig. 12.)

Promotion Through Efficient Instruction

1. *Source of Teachers*

An efficient staff of teachers is necessary to put over instruction which is worth while and satisfactory from the standpoint of the students. While some of the day-school teachers fit into the evening-school program to a certain extent, it also becomes necessary to train men from the trades to act as teachers. Prospective teachers for evening-school positions should be selected on the basis of practical experience, rating as a mechanic or foreman in the trade, and natural ability to profit by a teacher-training course. High-grade mechanics and foremen hold their positions because of their ability to plan their work, get out production, handle men, and give instructions. By subjecting such persons to an intensive teacher-training course some very good teachers can be developed.

2. *Teacher Training*

Every new teacher should take a short course in teacher training before being assigned to a class. In Lincoln, the teacher-training class is conducted for a period of four weeks before the regular evening school begins, and meets twice a week. This course provides for the organization of instructional material and methods of teaching evening-school classes. A course of this type is followed up with visits to the classes and individual and group conferences with the teachers.

The outline of the teacher-training course follows:

Unit I. *Methods of Teaching*

1. Lesson on meeting the needs of evening-school students
2. The developmental lesson
3. Demonstration of the manipulative lesson
4. Demonstration of a related-subjects lesson

Unit II. *The Unit Course Outline*

5. Unit divisions and lessons
6. The lesson outline
   - *a*) Objectives in the lesson
   - *b*) Points to be covered
   - *c*) Application of teaching methods
   - *d*) Questions for discussion
7. Organization of classes
   - *a*) Importance of starting the class instruction without delay
   - *b*) Records, enrollments, etc.

Summary

Satisfied students furnish one of the best means of promotion. They have personally experienced that efficient instruction has helped them in doing a better piece of work on the job.

The methods of promotion that have been considered are: (1) personal contacts, (2) advertising, and (3) efficient instruction of classes. While each one has a place in publicity, all should be used to serve a definite purpose.

The success of an evening-school program is measured not only in terms of the service rendered to those who take up short unit courses for one term, but rather by the number that continue to take additional courses year after year. The promotional methods, as indicated in the above, are by no means exhaustive but are only suggestive of what is being attempted in Lincoln.

The Shop Teacher and Personality

Louis V. Newkirk, Iowa City, Iowa

VOLUMES have been written about personality. Every teacher realizes the importance in having a desirable personality if he is to be a success in his chosen work. But what is personality? Is it possible to develop a personality? Are we mere slaves of heredity doomed to always act and think in a certain way or is our destiny to a large extent in our own hands? These are important problems in the life philosophy of every teacher.

The markets today are flooded with materials through which the reader is to suddenly find his latent powers and develop a strong forceful personality. According to these self-styled "psychologists," an individual can read these wonderful life-giving volumes and within a few short weeks become a leader among men, a man of affairs, and have in abundance the luxuries which man desires. "Discover this amazing power within you—a power so mighty, so all-prevailing, so irresistable that it knows no obstacle," states one of these psychologists.

Laird[1] tells the following experience: "Several summers ago I met a bank clerk in the Rocky Mountains. When he found that I was a psychologist, he came to me for advice. He had been working conscientiously for years and planning ways of 'getting ahead' to buy a home, but for some reason he seemed to be avoided by Lady Luck.

"He decided that it might be something beside enthusiastic work day in and day out that brought the vague reward we call *success*. One day an advertisement caught his eye. It started: 'You, too, may have this amazing secret of success.' After reading through the advertisement he sent in the coupon and soon had the books in his possession. Eagerly he drank in every word, feeling that here he had found exactly what he needed.

"Then he saw another advertisement of an 'Inner Power Now Revealed' book. He bought that. And another, and another until he had two shelves filled with books of this sort when I first made his acquaintance.

"These books I borrowed and read. In not one of them did I find anything that would help one in any other way than by reassuring him of his great potency for success—and assurance will not butter bread nor buy a home. In not one of them was there any real psychology that their owner could use. Yet I knew that practical psychology could be made plain and useful to anyone who could read."

Valentine[2] makes the statement that a "little exaltation will hurt no one. It is a healthful sort of feeling. But it is no substitute for intelligence, vocational ability, moral habits, leadership, culture, social habits, or any other desirable qualities which inheritance and creative experience alone can supply."

Granting that personality is not a mysterious something, and that it cannot be developed merely by a little inspirational reading, the question comes up—can it be developed in the light of what is known to the science of psychology? The answer is, Yes. Personality can be modified and improved through diligent effort over a period of time, but it is not an easy task or a task that can be accomplished in a few days or even months. It will take years to develop a well-rounded personality.

Valentine[3] tells us that "personality is the sum total of one's dispositions" and that these dispositions are the "consequences of two interrelated aspects of the total experience; namely, the native chemicophysical make-up of the organism and the stream of environmental factors that weave their influence into it." Obviously, since our personalities have resulted from the modification of our original natures by the environment, we can consciously develop more desirable modes of conduct by selecting the type of adjustments and then developing the valuable habits. It is quite true that the average teaching personality emerges with little conscious knowledge on the part of the individual. However, the individual could partially direct the development if he had in mind an ideal toward which to work.

[1] Donald A. Laird, Increasing Human Efficiency, Harper and Brothers, New York, 1925.

[2] P. F. Valentine, The Psychology of Personality, p. 355. D. Appleton and Company, New York, 1927.

[3] Op. cit., p. 21.

As an example, let us cite the development of the modern automobile. Its development is the realization of an ideal which has taken over a quarter of a century to bring about. It required much planning and testing to bring the automobile to its present state of efficiency. Today we hear adjectives like the following describing its traits: beautiful, durable, economical, safe, speedy, luxurious, etc. Now that the automobile is here, we are told that to get the most economical miles for the investment the car must be well lubricated and kept in proper adjustment. Furthermore, while automobiles are essentially alike in principle, they have certain traits which fit them to do especially well certain types of work. The two major divisions are passenger cars and trucks. Of course, there are variations in each of these types for the special services to which they are to be put.

Developing Personality

As a matter of fact there is much in the development of a human personality that is analogous to the development of the automobile. In the first place, it takes time to develop personality, but personality continues to develop as the result of a play between the original nature of the individual and the environment regardless of the conscious attention given to it. The problem then of the shop teacher who wants to develop a desirable personality is first to find out what type of personality will be of most value in his chosen vocation. Secondly, he must consciously cultivate those traits which will be of value and give real satisfaction and weed out those personality traits which are detrimental or of no value. This is a difficult problem and will challenge the most conscious and painstaking analysis that can be made not only by the individual, but also by his close friends.

In the first place, no individual can develop a normal, forceful personality without having physical health. It is known that very few people are up to the high plane of health that they could be if they would observe the simple laws of hygienic living. Anyone desiring to improve his personality should visit a physician and secure a thorough physical examination and then make a determined attempt to build up a reserve of physical energy. However, rest and exercise should be intelligently combined. An individual who is weak and run down may do himself extensive harm by taking too much exercise. A highly developed muscular system is not essential to health.

A teacher will do well to take a careful inventory of his social traits. What a rôle our personality plays in making us a success or a failure; in placing us in a good or a bad position! Valentine[4] states that some of the following may illustrate specific improvable social responses in a given individual's behavior: "getting excited when discussing religion; embarassment in the presence of one's superior officer; using a crude form of salutation or address; sneering when some particular subject is mentioned; giggling; assuming a bored attitude when another has the floor; interrupting; using a sharp or contemptuous tone in giving orders; being surly to a traffic officer; picking the teeth in public."

Desirable Traits

Coming now to some of the specific personality traits, the improvement of which increases the efficiency of the shop teacher and brings him in line for one of the more desirable positions in his chosen profession. For the purpose of objectivity a number of desirable personality traits for the shop teacher are listed below:

1. Sympathetic understanding of children
2. Resourcefulness
3. Self-control
4. Tact
5. Imagination
6. Neatness
7. Organization
8. Studiousness
9. Aesthetic sense
10. Interest
11. Sense of humor.

Sympathetic understanding of boys and girls is one of the finest assets that a shop teacher can have. It may help one to better understand childhood and youth to think back over one's own childhood experiences. The interests of boys and girls of today must be observed. Youth is an ever-interesting and refreshing problem, and a sympathetic understanding between the teacher and the pupil will do much to develop desirable attitudes in the pupils and lead to more efficient instruction.

Self-control is very desirable in any profession, but it is especially so in teaching. If the teacher is to have control of the class and make judgments that are fair to all, he must certainly have control over himself. It is too often true that teachers become nervous and irritable because of low physical efficiency and then get into the habit of losing self-control over relatively slight prevocations.

How often we hear it said that a certain teacher lacks tact. *Tact*, although a rather elusive concept, may be defined as "ability to analyze social situations and bring solutions which cause the least irritation." Tact is not only of value in the shop, but of great importance in all professional or social contacts.

The shop teacher must from the very nature of his work be a *resourceful* individual. There are numerous situations every week which emphasize the importance of this trait. If the teacher forms the habit of putting away in his memory the many clever ideas which come out in magazines and papers he will find many opportunities to use them.

The shop teacher would do well to form the habit of carefully *organizing* his work. It is frequently said of some individuals that they are just natural organizers. In reality, they organize these materials because they have formed the habit of organization. With conscious effort any shop teacher can develop the habit of organization.

Neatness is closely related to organization. Ordinarily, things that are well organized are neat. No one questions the importance of neatness, but some have not realized that it is a personality trait based on the formation of habits which anyone can develop by putting forth conscious effort.

Studiousness is a personality trait of great value to a teacher. It leads to professional growth and opens the way to professional advancement. One might suspect that some people are naturally studious, however, this is not the case, for the studious teacher has only formed well-established habits of study which any teacher can—provided he will.

[4] Op. cit. pp. 372–373.

Imagination is essential to all teachers for the planning of their daily tasks as well as for the future. It is not as susceptible to training as many of the other personality traits but, nevertheless, it can be cultivated. Images are essential to imagination so the individual who desires to improve his imagination will do well to store in his mind the types of imagery materials that are essential for imagination in his work.

The shop teacher, like any other teacher, needs broad interests for his teaching and for directing and enriching his own life. There is nothing peculiarly innate about acquiring a new interest. The way to develop an interest in anything is to learn something about it.

The *aesthetic sense* is a personality trait which all shop teachers should attempt to cultivate because of the importance of having a sense of beauty, proportion, and pride in personal appearance. Here again, it seems well to emphasize that a so-called sense of beauty and good taste are acquired through experience and thus are subject to conscious cultivation.

After all, one does not want to take this personality idea too seriously. The shop teacher, like everyone else, needs a *sense of humor* and a cheerful view of life which will help him to keep a balance and right sense of proportion.

I realize that it is only possible in a few pages to define the personality concept and outline some ways by which a shop teacher might develop a better teaching personality, but for those who wish to carry the study further and incidentally develop a scientific interest in it, the following books are suggested for further reading:

1. P. F. Valentine, The Psychology of Personality, D. Appleton and Company, New York, 1927.
2. W. F. Book, Learning How to Study and Work Effectively, Ginn and Company, New York, 1926.
3. H. D. Kitson, How to Use Your Mind, J. B. Lippincott Company, Philadelphia, 1921.
4. Donald A. Laird, Increasing Human Efficiency Harper and Brothers, New York, 1925.
5. John Dewey, How We Think, D. C. Heath and Company, New York, 1910.

Production Work in the Junior-High-School Printing Shop

Harry K. Gardner, Junior High School No. 40, Baltimore, Maryland

THE year 1928 was, in several respects, a very profitable one to the public-school printing teachers throughout the country. Many of the state conventions gave the printers important places in their programs, and the American Vocational Association Convention in Philadelphia recognized the importance of their work by inaugurating into their proceedings a program that was both well-rounded and intensive. The speakers, twelve in number, were among the leading printing educators of the country.

The Seventh Annual Conference on Printing Education, held at the Carnegie Institute of Technology, Pittsburgh, Pa., was an international affair, and printing teachers from several countries were in attendance. During the three days that this conference was in session, printing educational problems were discussed from every angle by capable speakers, and the meetings were a source of much profit to those who attended them.

At practically all of the meetings mentioned above, the problem of production work in the junior high school was brought into the proceedings and discussed at much length. In most cases it was spoken of adversely and in some cases condemned quite bitterly.

It seems that production work in the junior high schools has been a sore subject since the advent of printing instruction in these schools. It has been condemned by many, and especially by the printing teachers themselves. Many of them use as a war cry, "When production starts, education stops." The thinking, progressive printing teacher knows that when "interest ceases, education also stops." It is his job not only to educate, but to stimulate interest, because without the latter the former is impossible.

Production work, in limited quantities, is the greatest interest factor that the printing teacher has in stock. He has, in many instances, been condemning a blessing in disguise, when he frowned on production work for his shop. Unlike the woodwork or sheet-metal or electrical teacher, he is unable to inaugurate projects in which the pupil is given the result of his labor to take home for domestic use. He can't dangle a highly polished end table or a seven-tube radio set in front of the pupil to stimulate interest in his subject. But he should not forget that the printshop boy who sees his name printed on the several school lesson sheets and small forms used daily throughout the school, is far more stimulated to advance in his work than if just his home folks formed the audience that applauded his efforts.

As it is practically impossible for every pupil of the printing classes to work on these production jobs, they are wonderful incentives to keep up the competitive interest of the entire group. Give the boys who obtain the highest marks on the practice lessons each month an opportunity to work on production work, never forgetting to print their names and classes on the bottom of their jobs. Have all classes, from the seventh grade to the ninth grade, work on these jobs. Reserve the more simple forms for the seventh-grade classes. Keep the marks which students earn on production work on a special chart where all the printshop students can see them at all times. This will give an incentive to aim for better marks.

The average time of a shop period being from 45 to 90 minutes, it will often be necessary to cut the copy of the job into several "takes." This is a good thing, as it enables the teacher to distribute his production job to more than one of the leading pupils. On a job of this type, it will be necessary to print the names of the group that produced the work.

When the printing teacher has worked with his classes for a period of six weeks, he is generally able to make a classification of the group. Some teachers rate

their students as "good, bad, and indifferent," others rate them as "good, better, best." The writer prefers the latter classification, as psychologically, it seems fairer to the entire group, especially the retarded pupil. There is a certain percentage of the retarded group that will be unable to master the intricacies of type composition. As this group is generally small, it is well to divide their time into composition, presswork, padding, stapling, counting sheets, folding, and the several little odds and ends that are invariably found to be done in the printing shop. In the way, such a pupil also sees his name printed on a job from time to time.

It helps him to realize that, although he did only part of the presswork or of the stapling, nevertheless, that he was an important unit in the completion of the job. The stimulation which this gives his self-respect is well worth the effort of working him into the scheme with the other group.

The writer, like many more of his colleagues in junior-high-school work, is limited as to material. In the past year enough 10-point body type has been accumulated to sufficiently equip special cases to accommodate an average class. These cases are awarded on a competitive basis. The class that shows the highest marks as a whole, in a given time, is allowed to use these cases until the end of their term. Each case is labeled with the name of an individual boy, and he is held strictly responsible for its condition at all times. The class that wins this privilege is called the "honor class," and they usually produce the contracts for the civics, history, geography, and English departments of the school.

It has been found that class competition has been just as keen as individual competition. All classes look with longing eyes on this row of private cases that belong to the honor class. Each boy wants to see his own name printed on one of those labels, and many are the requests to be allowed to return after school to try to better a mark so that the individual's class will have a better chance to win these honor cases.

It may be said in criticism that this method of procedure is vocationalizing industrial arts in the junior high school. Such is not the case, however. The junior-high-school theory pertaining to industrial arts is, in substance, that industrial arts develops industrial appreciation by participation. It also develops industrial intelligence and contributes to general experience and industrial expression by personal contact. Good habits are inculcated by the concentration and judgment necessary to produce a creditable job of any kind, so why should not a child be stimulated to give of his best in an industrial-arts shop up to the limited provisions of this theory.

To view the subject from another angle: What red-blooded child can be expected to foster an interest in producing continuously, throughout the year, exercise work that is destroyed immediately after its excellence has been passed upon by the instructor?

Last, but not least, production work is with us in the junior-high-school printing shop, and probably always will be. It is not to be deplored, as it is the one big stimulus-bearing factor of the junior-high-school printing teacher. It justifies his subject to his classes and gives them a real objective to work for.

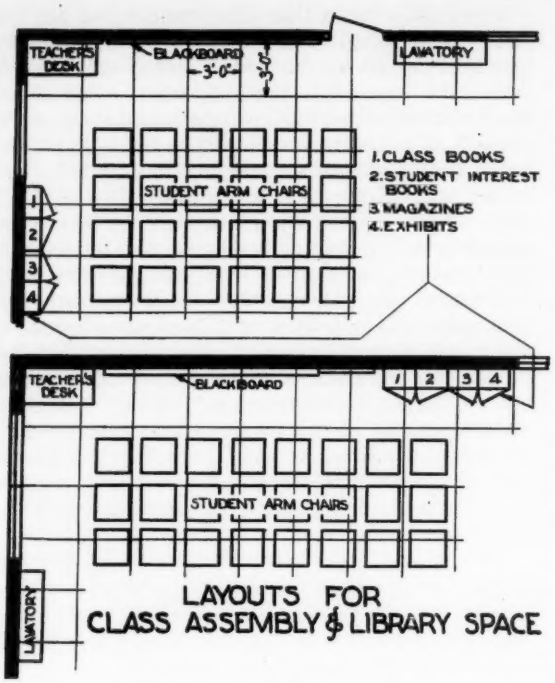
The Shop Library

J. W. Bollinger, Tulsa, Oklahoma

THE accompanying layout shows two arrangements for shop libraries. Each one shows a corner of a room fitted with tablet-arm chairs and a blackboard, for class demonstrations, study of related material, recitations, quizzes, shop tests, and the like. The teacher's desk, bulletin board, lavatories and drinking fountain, and a series of bookcases are conveniently placed. In the first bookcase are to be the circulating books, and the sets of books which are intended for class use. In the next case are to be the reference books and the student-interest books. The third case is for magazines, with storage space for back numbers. The last case is used for displaying good pieces of pupil's work, for showing pieces of work illustrating the successive steps in making a certain project, or for an educational exhibit on such subjects as the manufacture of steel, the construction of an automobile engine, and the like.

The only additional expense involved in adding a shop library, therefore, is the cost of the four bookcases, and the only additional space required is the few square feet of floor and wall area which these cases will occupy. The pupil using the library would sit in one of the chairs, the tablet-arm rest permitting him to do any written work or sketching which he might wish to do. The lavatories should be close at hand so that the students can wash their hands before going to the bookcases. The bulletin board should be accessible so that any particular directions which the instructor may have to give, may be readily posted. The teacher's desk, placed as it is, is in a strategic position with reference to every part of the layout. The entire equipment should be in use continually, either for classwork, or for library work.

Aside from the consideration of what the library shall be like, a number of other problems present themselves. In the first place, it is necessary to teach boys how to use the library. They must be shown the necessity of washing their hands before handling any of the books or magazines; and they must learn to make a habit of it. The lads must further be cautioned not to take the books to the benches, but to copy on scratch paper or into a notebook whatever information or drawings they may wish to use. Then, too, some system of returning books to their proper places on the shelves must be worked out. The biggest difficulty, of course, is the checking up when each class is ready to leave, to see that every book and magazine is in its proper place. It may be well, to interest one or two boys in each group in the upkeep of the library. It should be their duty to return the books to the shelves, and to report any irregularities to the instructor. Checking up the bookshelves will have to be done before any other checking up is done



at the end of the shop period. If any of the books are to be circulation books — and there certainly ought to be some — the matter of checking books in and out, and of chasing down forgetful students, will likely give the instructor a few gray hair. Checking out books at stated periods, say before and after school, must be done by the instructor himself. This will add another responsibility to his duties.

It is necessary also to guard against abusing the library. Under no circumstance should the library be allowed to become a means of carrying along the shiftless, the recalcitrant, or the lazy fellow who says: "Aw, I don't like this course; let me look at some pictures," or "I can't make this thing. I'd rather quit and read books." Neither should the library be used to placate the bully, or as a penalty assignment for shop misbehavior. Instead, the reading privileges should be taken away as a punishment for poor shop behavior. Penalyzing by assigning reading defeats the prime aim and purpose of the reading.

Checking Pupils' Reading

Did you ever see pupils sitting in a library, "browsing" here and there? Have you ever asked what they got out of their browsing, or what one specific thing they had learned? Too many pupils merely page through the books to see the pictures; some do not even see the pictures. Under such circumstances it is certainly difficult to estimate just how much the pupil has benefited from the experience.

Evidently, some method of checking up on the pupil's reading must be worked out. One way is to require him to give a report, either written or oral, before the class, or to the instructor. Sets of questions to be answered from what has been read is another method of checking. As an award, the instructor might then grant the student who has successfully answered the test questions a certain number of "points." As a matter of fact, a definite number of points in reading may be set up as a required part of the work in the shop. As a further method of stimulating interest in reading, the points earned by the pupils might be arranged in the form of a progress chart, and posted on the bulletin board so that each pupil could see how he stood with relation to his classmates.

Selecting the Books

A final and most important consideration is the kind of books to be selected for the library. The method in use heretofore of giving oral instructions has too many defects, chief of which are that the instructor giving impromptu directions is not nearly so apt to give them in as good form as they could be presented in a text, and that once the instructor has given the directions, the pupil has no way of refreshing his memory other than to have the instructor repeat what he had said. It must be evident to any shopman that much more effective teaching can be done if as much of the instruction as possible is given with the help of books, especially if a place such as is described is provided in which to use the books.

By using a shop textbook, all students have access to the same amount of information, and the material is always available. By their use, each student is enabled to advance as fast as his ability will permit him to; and when a student is absent from class, he may resume his work upon his return without disturbing the order of the class. Then too, if a new student joins the group late in the term, he will fit into the course more readily without taking too much of the instructor's time.

There also should be books on related matter covering certain other required study not found in the class text. Such books would be reference books, books on special subjects, government pamphlets, manufacturers' catalogs, special bulletins, and the like.

Biographies of captains of industry, business men, executives, and professional men should be included. Stories about Henry Ford, Andrew Carnegie, Charles Schwab, and Thomas Edison, are of great value. History and description of industry, like the manufacture of a Ford automobile, of steel rails, of a newspaper, of high-grade furniture, and the like, also are useful.

There should be books on other lines of work than those represented in the shop, to broaden the pupil's experience and to interest the wayward or exceptional pupil. Such books might be termed student-interest books on the making of toys, puzzles, games, kites, gliders, airplanes, sailboats, model boats, and the like. In addition there might be books on radio and electricity, and on other activities which appeal to the pupils. Books on "How It Works," and "Why the Wheels Turn," come in this category. It would be advisable, of course, to have on hand at least some of the materials and tools required in doing some of the work described in each of these books, otherwise they will not appeal to the students.

Books, discussing the requirements of the common trades, should also be available. If the pupil's reading can then be followed by a trip to see men working at a given trade, and if they are given an opportunity to discuss this trade, its requirements, and its possibili-

ties, with the men engaged in it, a wonderful service would be performed for the pupil.

Some books made up of pictures, accompanied by short descriptive passages, also should be found in the library. Such books would teach some pupils more than a whole library of textbooks.

Magazines

Magazines of various kinds are indispensable to the shop library. Their value, if rightly used, cannot be questioned by anyone.

The pupils in our schools are accustomed to using texts in the study of their academic subjects. They have been trained to acquire their knowledge by way of the eye and the printed page. The present method of oral instruction practiced by the shop teacher is inefficient partly because the pupils must first be trained to get their instruction by way of the ear and the spoken word. This reason for inefficiency would be done away with if tests and some of the newer job sheets were used.

If the shop teacher is adept with the pen, he may find a fertile field writing books such as have been mentioned in the foregoing. More books by men "on the job" are needed. Shop libraries, properly conducted, will do much toward bringing the industrial arts into their proper place among the "major subjects" instead of among the "frills."

Class Control

P. Francis Edgar, Yorkville Junior High School, New York City

NEW teachers, both men and women, undoubtedly experience the same reactions when they first enter the teaching profession. A large majority remain in the profession—the rest go into other lines of endeavor. Many of the latter because they did not hit the right method of "holding their classes." The writer herein attempts to record his observations for the last four years.

Introduction

Generally the first contact between the instructor and the pupils presages the instructor's future success or failure with a given class. The class, of course, expects certain things of the instructor. Among these are that the instructor dominate the situation, as "boss," that he has a complete knowledge of his subject, and that he is conversant with the related subjects. Lack of this knowledge is usually one of the first causes of a break between the instructor and the pupils.

The instructor, on the other hand, expects, and has a right to expect, that his pupils are normal mentally, and that they have a desire to learn something about the subject which he is teaching.

While the instructor will naturally evaluate the mental capacity of each student, he should not forget that he is also being "sized up" by the students. He should avoid errors in methods of teaching or in content of lessons, caused either by inexperience or carelessness.

The instructor should, as soon as possible, team up students in their work so that the best possible good can come of the combinations. Remembering the old adage, "Birds of a feather flock together," he should not permit subnormal students, or students inclined to be refractory, to work together.

He also should establish helpful relations with the rest of the faculty, because as soon as the class sees that he has the cooperation of the other instructors, his work becomes easier.

A trade instructor also should create and maintain an amicable relation with men in his trade—employers, trade unions, superintendents, foremen, and employees.

Instruction

The instructor's stock in trade, is his lesson content and his ability to put it across. The mental caliber of the students must be recognized and the instructional matter must be written accordingly. It must not be forgotten that the mental ability in the trade classes usually varies from very good to poor.

The best method of putting the subject matter of the lesson across to the students is to set them at the problem which it involves. All lessons should be motivated by actual work. Lectures are useless if they do not end in work which the student himself must do.

No advance in the course should be made without back-checking on that which has gone before. A house cannot be built without secure foundation—likewise no course of instruction can function in a student's life unless basic elements are thoroughly understood. The best method is constant review of the work by the individual students.

In criticizing the work of the students, much better results can be achieved by one word of appreciation than by a hundred of abuse. Students, in fact all of us, love praise. Its frequent use makes for a contented class. Rewards, either of the privilege or of the material kind, tend to stimulate greater activity for good in the class.

Control

The first means of control that a new instructor resorts to, is fear. Fear is a native reaction. We all have it, more or less. It usually is successful in a manner. Thus threats to inform employer, principal, or the parents of the students' misdeeds, usually bring about at least some measure of result. Some students respond very quickly to the threat of physical chastisement, but this type of threat ought never to be used, even with students who have little home training.

The instructor should have a personality, mentally and physically, that the students can respect. He should impress the students with his desire to help them. He should be careful not to give them the idea that he desires to placate them by catering to them.

In controlling the class, there are two general methods. First, the one-man method, in which the instructor is the only authority in the classroom. This method usually creates a gap between the instructor and the class, and all of the directive work must be done by the instructor. The result is incomplete or improper instruction. Second, an organization in the

class similar to that found in an industrial shop. This means that the instructor appoints student assistants to help him. Under this type of organization the students are more contented. The instructor is relieved of many irksome details, thus gaining time which he can devote to actual instruction.

Organization of Class

The organization of the class should be made with the following in mind. First, to facilitate the instruction and to maintain discipline. This can be handled nicely by having a foreman, who has complete charge of the class. An assistant foreman who takes charge of the production work of the class, but who also acts as foreman in the absence of the latter. A second assistant foreman, who maintains discipline while class is in session, but also acts in place of either of the other two. These officers should be picked for their capacity for leadership, their trade knowledge, and their ability to cooperate with the instructor and to interpret his orders to the class. Secondly, to safeguard public property against theft and damage. This problem can be solved by the appointment of a property clerk and an assistant property clerk. These two can alternate in issuing and collecting supplies and tools. They should be picked for their honesty, aggressiveness, and neatness. Thirdly, to facilitate the taking care of the clerical work, which has always been the worry of the instructor. This problem can be solved by appointing a class clerk, who can handle the class register, reports, and correspondence. He should be picked for his education, penmanship, and ability to grasp details.

Summary

Finally, success in trade intruction is predicated on the following:

First, there must be sympathetic understanding between the instructor and the class. There must be an honest desire on both sides to be mutually helpful to each other.

Second, the instructional content must be beneficial and interesting. It must be of such a nature that it can be reduced to dollars and cents in the near future.

Third, the class control must be such that it creates voluntary acceptance by the class. This can be obtained most readily by creating a respectful attitude in the class for the instructor.

Fourth, the class organization should be built up with the idea in mind, of relieving the instructor of as many minor details as possible in order to allow him greater time to devote to instruction.

A Systematic Method of Grading Shop Projects

Carl J. Hager, High School, Jefferson, Wisconsin

ONE of the much-discussed problems of today is a systematic method of grading shop projects. The writer finds a very limited amount of material on this subject. In a few cases, teachers have attempted to compile certain data which would enable them to give a more accurate method of measuring a student's work. One of the main difficulties is to decide what should constitute a grade. It has been demonstrated that no two teachers grade the same. A pupil with an "A" grade in one school may be rated with a failure in another.

The writer has found in discussing the method of grading with other instructors of shop projects, that the most commonly used method is the more or less of hit-or-miss method, based entirely on the finished project. If these grades were divided into the several elements leading up to and including the finished project, how much more nearly an accurate grade could be reached.

Robert S. Ellis in his "Standardizing Teacher's Examinations and the Distribution of Class Marks," says: "It has been commonly, though mistakenly, assumed that a grade of 85 meant 85 per cent of perfection; practically, it has been found impossible to apply that idea with much success in most cases, and a little reflection will show that the real standard has been the judgment of the teacher. Teachers with low requirements tend to give high grades, those with high requirements tend to give low grades." From this it is clearly evident that in our attempt to apply absolute standards, to consider 100 per cent as meaning perfection, we have fallen very far short of success.

It is, therefore, necessary for the instructor, who uses the hit-or-miss method, to first of all analyze his trade and job and this analysis should lead to some definite construction of a particular process. For example: An instructor in forging has a different problem than the instructor in woodwork in the performance of certain processes. One might think at first consideration that each process should receive a certain amount of credit and be given due consideration, but right here is where other things have to be thought out. There are numerous points which enter into the discussion, such as speed, accuracy, approach, attitude, aptitude, achievement, tests, appreciation, cooperation, application, initiative, quality, and perhaps many others that might be fitting to the particular needs. It is necessary, therefore, in making a rating chart to select those factors which are duly recognized as most essential.

The attached chart is an attempt to embody those factors which are of most importance to the forming of a systematic method of deriving a grade for shop projects. The standards and their percentages were arrived at after the writer had submitted a chart of this type to a summer-school class of University of Wisconsin students in a survey of industrial-arts courses under the supervision of H. W. Schmidt. A varied opinion resulted from which the writer compiled the data and drew up this particular chart.

The first standard on this chart deals with *Speed*, and we find that it should receive about 12 per cent of the total grade of 100. This rating is judged almost entirely from the objective. It will be noticed that this score is based upon the student's achievement, rather than on a cut-and-dried schedule laid down by the

teacher, which in most cases deals with group instruction and not the individual's work. Charles Russell in his book on Classroom Tests has this to say about the subject: "It would seem reasonable to suppose that pupils should be marked in one of two ways. They should be marked according to their achievement in relation to their own ability or else they should be rated according to their achievement in relation to the ability of the group of which they are a part." In a later chapter he says: "It should be easy to see, that if pupils were marked upon the degree of their achievements in relation to their capacities to achieve, a pupil with a relatively low capacity and a somewhat relatively higher achievement would deserve a somewhat higher mark, or grade, *in effort*, than a pupil with a high ability and a relatively low achievement." Therefore, when reading the chart and looking over the five squares after the standard *Speed*, you will find one word and the percentage which will fit the project and pupil you are grading.

Quality. The next step of importance to accuracy is allotted 20 per cent. In this chart, *Quality* is based upon the excellence of general appearance, finish, and design. Taking, for example, a group of end tables, on display, one of the first impressions one gets is the finish. In the majority of cases, one will find himself feeling of the finished surface to see whether or not the individual has done a good paint or varnish job. If the piece is very attractive, perhaps that draws attention to the eye before the finished surface does. I find that the average person looks more toward these two points than he does toward the rest of the workmanship.

Approach is another important factor. Does the student have a definite problem in mind and does he plan his work in advance? For example: In some shops little or no finish, fastenings, etc., are carried by the department and the student is required to purchase these things. One will find that some students are always prepared, have always purchased their extras, and when the period starts are at their work immediately. Pieces

School _____

Dept. _____

Student's Name _____ No. _____

Shop _____ Grade _____

	Standards	6	5	4	3	2	1
Speed	Has the student spent too much time on the problem judging from past work?	Very slow 7 points	Slow 8 points	Moderate 9 points	Fast 10 points	Rapid 11 points	Very rapid 12 points
Accuracy	Based upon correctness and precision with which the work is done	Very Inaccurate 15 points	Inaccurate 17.5 points	Approximate 20.5 points	Close 21.5 points	Fine 22.5 points	Perfect 25 points
Quality	Based upon the excellence of general appearance, finish and design	Very poor 12 points	Poor 14 points	Fair 16 points	Good 17 points	Very good 18 points	Excellent 20 points
Approach	Does the student seem to have a definite problem in mind and does he plan his work in advance?	Very haphazard 11 points	Haphazard 12.5 points	Fairly well systematized 14 points	Mod. well systematized 15 points	Well systematized 16 points	Very well systematized 18 points
Attitude	The student's mental reaction toward his work	Indifferent 9 points	Passive 11 points	Interested 12.5 points	Very Interested 13 points	Eager 13.5 points	Enthusiastic 15 points
Tests	On related material. Test to show the pupil the efficiency with which he has worked	Below 60 6 points	60 to 69 7 points	70 to 79 8 points	80 to 85 8.5 points	86 to 90 9 points	91 to 100 10 points
	Total	60	70	80	85	90	100

ACHIEVEMENT CHART

Accuracy, the next standard, is one which caused considerable discussion, and varied estimates of its value to the perfect score. Accuracy, as it is defined on the chart, is based on correctness and precision with which the work is done. And again, the teacher must take into consideration the pupil's past work. The writer, however, is not in favor of a scaling or measuring device such as has been set up by some instructors. A certain amount of proficiency is expected, however, regardless of the project. For example, in woodwork the simple steps in the squaring-up process can be checked with a try-square and rule, and certainly an instructor must hold his standard very high, for these steps are very essential in any finished piece of cabinetmaking.

are systematically arranged in their lockers, and tools are handy and in good working condition on their benches. The student who carries on his work as stated, has planned his work carefully ahead of time.

Attitude is not to be overlooked, but perhaps some instructors may feel that the percentage allowed here may be too small or too large. Here it is based upon the students' mental reaction toward his work. In some instances, we find pupils unsuited for the particular shop and still others forced to take a shop against their wishes and still others who simply take the shop for a recreational period. The teacher, though, under this standard plays a most important part in trying to arouse an interest in the several types mentioned, but even he fails, at times. It is, of course, the writer's idea

to have these charts available at all times so that the pupil may diagnose his own weaknesses.

Tests, the last factor entering into our problem, may serve a dual purpose by testing the knowledge of the students as well as acting as a check on the success of the instructor in putting his project across. Much attention has been given to the standarization of tests in the general educational courses, but little has ever come of attempts made along these lines in subjects pertaining to the industrial arts. The writer does not agree with some instructors in allowing the finished project to act as a final check on the student's ability; neither does he place the importance of tests as the most integral part of his industrial-training program. The objective test has proved much more reliable than either the written essay or the discussion type. It is defined as "an examination where the grading does not involve the personal opinion of the grader."[1] The pupil writes but little, as the answers are given either by checking or underlining. One of the best-known types of the objective test is the true-false test. This kind of test is a statement consisting of partly true and partly false facts which must be designated correctly either as right or wrong by the pupils in their answers.

[1]G. M. Ruch, Improvement of the Written Examination.

In a course such as manual training (especially where the manual-training instructor makes outside reading a requirement) this type of test proves invaluable. In fact, it is the most reliable kind of an examination. As the method of answering consists merely of a "Yes" or "No" or of a plus or minus sign, the pupil must needs be very definite, making a lengthy and wordy answer impossible. The objection sometimes brought to bear against the true-false test as applied to other subjects proves especially valuable as an asset when applied to the industrial arts; i.e., that of confusing the student, and giving him incorrect ideas. To act quickly and correctly, as a manual-training student is often required to do while at his project in the shop, he must needs know immediately what is right and what is wrong; in fact, to be able to designate between the true and false is sometimes the main aim of instruction.

The writer is not convinced that one will use a chart of this type at all times in grading, but the effort is to arrive at some definite standards upon which we, as shop teachers, are to base our measurements of shop projects. In time, these standards will become fixed in our minds and we will automatically consider each point in giving a grade without the use of a charted distribution of percentages.

Correcting Multiple Choice Tests

Howard W. Boekeloo, Kalamazoo, Michigan

MR. Paul N. Wenger, of Greenwich, Conn., has outlined a very good set of simple tests for the woodworking shop in the May, 1928, issue of the INDUSTRIAL-ARTS MAGAZINE. Each question contains four statements from which the students must select the proper one.

There are many advantages to this type of test. In the first place, it removes the personal equation from the teacher's mind in checking and grading. No boy with attractive personality and glibness of expression can receive more credit than the boy who is unattractive, or who belongs to the slower type and yet possesses the information. Secondly, there is little chance for guessing the correct answers. Contrary to general opinion, these tests promote much thought and concentration before the proper answer can be selected. If the tests are typed and mimeographed, the class can write them in from 10 to 20 minutes, while the old-style examination takes about an hour without disclosing much more information. The greatest value to the teacher lies in the ease by which the test can be corrected. If the questions are to be changed frequently, so that it is not advisable to type and mimeograph them, the student can rule a sheet of paper as shown at Figure 1 and write the questions from dictation or, perhaps from a copy placed on the blackboard.

In either case the method used in selecting the right answers will be about the same. Each right answer selected should be marked directly over the answer with a legible O.K. and each wrong answer should be crossed out with a line drawn directly through it. This leaves no guessing as to the intentions of the student.

To illustrate the method that may be used in correcting tests of this type Mr. Wenger's Test 3 on Wood

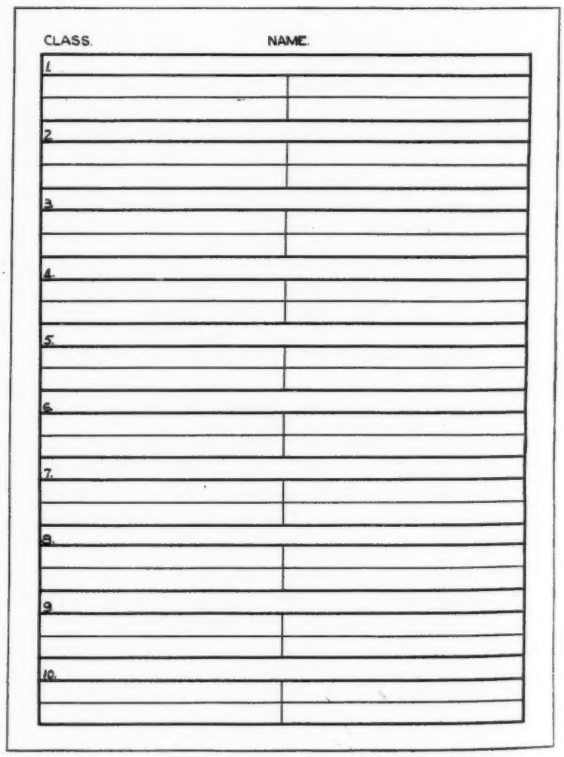


FIG. 1

TEST No. 3

Wood Finishings

I. The pores in open-grained wood should be filled with:
   1. Putty.
   2. Paint.
   3. Wood filler.
   4. Shellac.

II. Which vegetable matter may be used as the basis for a wood filler?
   1. Flour.
   2. Cornstarch.
   3. Baking soda.
   4. Oatmeal.

III. Surface glue should be removed because:
   1. It is wasteful to leave it on.
   2. The instructor wants you to do it.
   3. It greatly increases the appearance of the project.
   4. It is good tool practice.

IV. The purpose of rubbing shellac or varnish after it is dry is to:
   1. Make a smooth surface.
   2. Use the pumice stone and sandpaper supply.
   3. Follow the customary habit.
   4. Mix the previously applied finishing coats.

V. Stain is used on wood for:
   1. Filling the pores.
   2. A basis for other finishes.
   3. Making a moistureproof finish.
   4. Changing the wood color.

VI. The bottom of a table lamp should not be stained because:
   1. It spoils the appearance.
   2. It may stain the tablecloth.
   3. It will slide off the table more readily.
   4. It will cause it not to set level.

VII. Shellac is usually thinned with:
   1. Benzine.
   2. Turpentine.
   3. Linseed oil.
   4. Alcohol.

VIII. Wood finishes are made by:
   1. Gane Brothers and Co., New York, N. Y.
   2. Thomas Garman and Co., New York, N. Y.
   3. S. C. Johnson and Co., Racine, Wis.
   4. Barnhart Bros. and Spindler, Chicago, Ill.

IX. A varnish coat is usually dry within:
   1. Several minutes.
   2. Several days.
   3. One hour.
   4. Two hours.

X. Wax is usually used as:
   1. The basis for a shellac coat.
   2. The basis for a varnish coat.
   3. A crevice filler.
   4. As a finishing polish.

FIG. 2

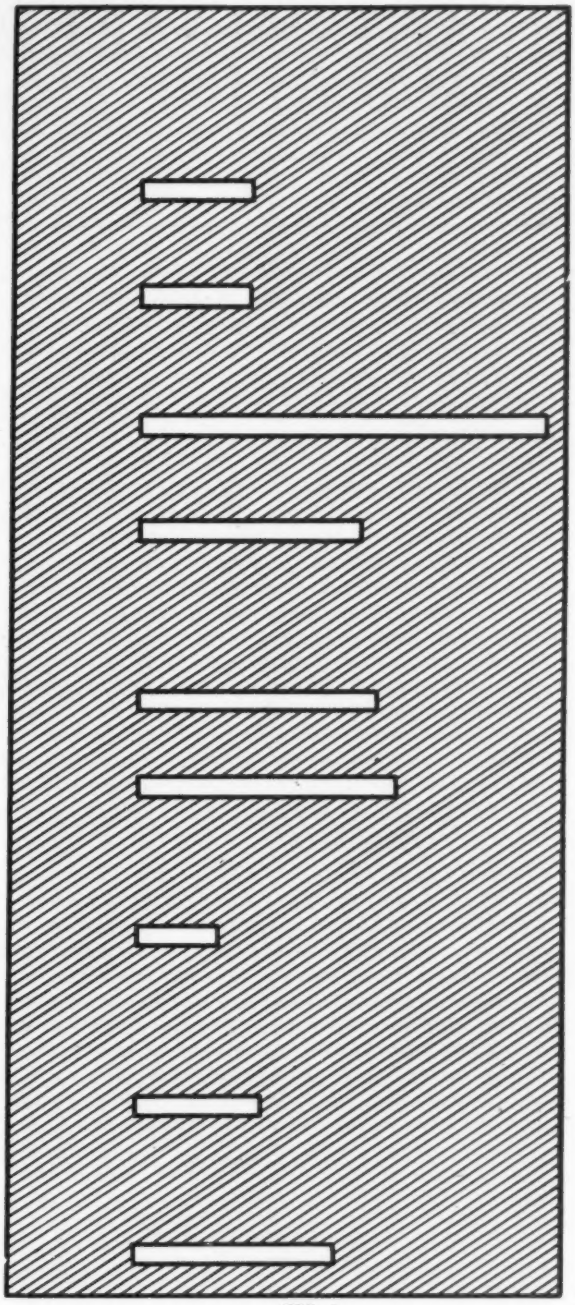


FIG. 3

Finishing is herewith shown in Figure 2. To make the check sheet shown in Figure 3, take a sheet of tough yellow manila paper and lay it under the mimeographed or ruled sheet and with a pin point, prick through four points or at each corner of each of the correct answers. The upper sheet is then removed and the four corners of each answer are connected by lines to form a rectangle. These rectangles are then cut out with a sharp knife thus making the stencils as shown at Figure 3. These can be placed on each test and a glance will determine whether the answers are right or wrong. If an O.K. shows up through the opening, the answer is right: if a crossed-out word shows, the answer is wrong. By having each answer count for a mark such as, say on a test of ten questions one wrong averages a B, two wrong C, three wrong D, four wrong F, etc., the mark can be quickly determined. A set of twenty papers with 20 or 25 questions each can be marked and graded in 20 minutes or less.

MEASURING RESULTS

The school ought to measure the effectiveness of its teaching not by the success of the pupils in reciting what is presented in the textbooks, but by the number of topics in which the pupils become sufficiently interested to make independent inquiries.—*Charles Hubbard Judd.*

INDUSTRIAL-ARTS MAGAZINE

EDITORS

E. J. Lake *J. J. Metz* *S. J. Vaughn*

STARTING OUT RIGHT

Right now, at the beginning of the school year, is the time to put into action those plans and ideas which we had determined to inaugurate when this or that occurrence in the shop classes last year made them seem necessary or advisable. It may have been a question of methods; it may have been a question of management. At any rate, and whatever it may have been, the time to start putting it into execution is at the beginning of the school year. This holds good for the new teacher as well as the old. Of course, the new teacher may not have past experiences to build upon, but he must carefully lay out a plan for action even though he may have to change it during the year. When once students have commenced to do things in the shop in the wrong way, it is very difficult to have them change. It is better to start right from the beginning.

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ADAPTING INSTRUCTIONS TO THE BOY

One of the duties of the teacher is to impart knowledge. To do this, that which is to be imparted must be scaled down to the learner's understanding. The teacher's duty is to clarify so that the student may understand. This means that all instructional material has to be couched in language which the student can grasp. As the student grows older, it is to be hoped that his vocabulary increases, but in the process of learning, the learning steps must not be too difficult. Of course, if a certain subject requires technical terms, these terms should by all means be used. However, the language used in explaining the different steps in a problem or process, or in the related subject matter, should be confined to the ordinary English with which the boy comes in daily contact.

One supervisor who visited a class where a certain teacher was volubly explaining a scientific fact in language way beyond his hearers', remarked when he came out of the class, "That teacher is the grand mystifier." It may be well at times to use only the choicest language and the most euphonious terms, but if they do not clarify the subject in the student's mind, they might just as well not be uttered. The same may be said of introducing words that are not commonly used. Of course, here again, if the term is a shop term or a technical term, although it has only limited application, yet in the subject being taught it forms a vital part and therefore should be used. But care should be taken not to introduce words merely for the words' sake. The shop teacher has a sufficiently large duty if he attempts to impart to the student the words which he needs in a given shop course. While improper English should not be sanctioned in the shop, nevertheless, the primary object of the shop is not the teaching of language. The teacher should therefore content himself with expressing his explanations, orders, directions, etc., in correct English, but in the simplest terms possible, so that the subject is clarified rather than having the student become mystified.

The greatest teacher of all took great pains in couching His parables and instructions in language that was simple and understandable. He did this even when He was conversing with His apostles and disciples whom He was really training as teachers who were later to instruct the world. Why not learn from Him and do likewise?

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USING THE BLACKBOARD

The blackboard is a wonderful teaching aid to the industrial-arts and vocational teacher who can draw. With a few lines, a simple diagram can be placed before the class explaining the action of a mechanism which would take hundreds of words to explain. However, it is not only the teacher who profits by the well-made sketch on the blackboard. Many pupils are eye-minded more than they are ear-minded. The sketch on the board helps them visualize what they are studying. However, the sketch need not merely appeal to the eye-minded person, because a teacher very seldom relies entirely on a drawing for putting across an explanation or a lesson. The sketch, therefore, is in most cases accompanied by verbal explanations. Hence, both the eye-minded and the ear-minded are served, and both of them gain at least something by the one faculty which may not be as well trained as the other, be that faculty hearing or sight.

That the blackboard is used in many shops is plainly visible to the caller. Some teachers realize just how much benefit they can get out of the blackboard and are continually making use of it. Sketch after sketch is placed on its surface. Each pupil is taken over to the blackboard in his turn and another sketch is drawn upon it. Some of these sketches are large, some small, some stuck in this corner, some elsewhere. The eraser is used only when absolutely necessary, and it is necessary to use it only when every square inch of the blackboard has been covered with chalk. Unsightly blackboards of this kind ought not to be tolerated in the school shop. Many teachers who are quite punctilious about the appearance of everything else, forget that the blackboard in a disorderly condition also has an effect upon the boy. It is well, therefore, to put this down as one of the items that is to be watched during the coming year. A blackboard that is continually used need not look disorderly if the teacher pays a little attention to cleaning it or having it cleaned at least once a day.

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SYSTEM

Recently the writer had occasion to observe the work of a gang of movers. They were in the act of stowing away into one of their big vans the furniture, pictures, hangings, utensils, and what not, with which man surrounds himself in his home. He observed that they very carefully chose the heavier furniture to make a foundation for the lighter material. While idly watch-

ing them, the thought struck him how much the teacher's occupation resembled that of these movers. The teacher, too, must carefully choose from the large amount of material at his disposal, those things which are best fitted to make the foundation for that which comes after. Like the mover, he must be careful that the foundation is right in order to properly carry the superstructure which is placed upon it later on. After the right material has been chosen as a foundation, the details can be more and more refined, because the process of assimilation becomes easier in the proportion in which the foundation prepares for this assimilation.

Just as the mover has carefully reasoned out the best method to be followed in stowing away the goods which he wants to move, so the teacher must carefully plan out the sequence in which he is to transmit the knowledge which he wants the pupils to take away with them. Haphazard loading of the moving van would produce an ill-balanced load and might cause breakage of valuable household equipment. Haphazard instruction, however, causes greater harm because it may produce not material wreckage, but human wreckage.

Systematic planning of instructional material, therefore, is not merely to be recommended. It is an absolute necessity.

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PRACTICAL PROBLEMS

The time of the abstract exercise in the school shop is fast disappearing. There was a good reason for its appearance at one time. Manual training was introduced as a solution for a problem. Its exponents felt that students were to accomplish certain things. In order to accomplish these things, they introduced exercises which gave the students opportunities to acquire certain experiences and skills. It was soon discovered, however, that these abstract exercises lacked the element of interest. Hence, at present pure exercise work in the shop is frowned upon, and an additional burden has thus been placed on the shop teacher in his planning for his shopwork.

It was comparatively simple to devise an exercise which would introduce a given process. It is much more difficult to devise a project which is of practical use, which interests the student and which also embodies the given process without adding too many other complications. In spite of the additional burden which this planning imposes on the teacher, nevertheless, that is what we must aim for in the planning of our shopwork. Our practical problems must just as surely present to the student an opportunity to acquire experiences in the use of materials and tools as did the exercises of the past.

The introduction of practical problems, however, must not become a fetish to the extent that practical problems are introduced merely as projects. They must actually teach that which the manual-training teacher of old taught with his exercises. They must not be mere time-fillers. The teacher who says "I am going to keep my boys busy" has the right idea, provided he keeps them busy with something worth while.

There is no question that the old-time exercises fulfilled a real need. They were real solutions of definite problems. They were discarded merely because they lacked the interest factor. The teacher of today must, therefore, be careful to introduce projects which embody not only the interest factor, but which also teach the same facts and skills as the exercises which his projects displace.

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SUMMER SCHOOL

The attendance reports from various summer schools indicate a falling off this year in the industrial-arts department. Just why this should happen is hard to explain. Surely the teacher-training schools are not to blame for this condition, because in the main they have tried to keep abreast of the trends in industrial-arts and vocational education. They have made their courses as practical as possible, and knowing their field, they are doing their best to prepare teachers for their future tasks.

Industrial-arts teachers who are now in the field, in many cases, are men who have not had the advantages which these teacher-training institutions offer. Many of these teachers have been obtained directly from industry. In other words, they are men fully versed in the industrial knowledge which that trade demands, and fully equipped with experiences of great value in industrial situations. However, knowing the needs of industry and knowing trade methods need not necessarily make good teachers out of such men. They may not need any trade preparation but they surely do need teacher training. To have knowledge of trade processes and to teach these processes are things of quite different natures. Instructors, therefore, who have not obtained their methods of teaching at a teacher-training school will do well to remove the handicap under which they are laboring at the earliest possible moment. This they can do by attending summer school. Then, too, there are many instructors who have had but a meager training as teachers. There are some who have had no more than two years of professional training beyond the four-year high-school course. These also should not fail to improve themselves educationally by taking additional work during the summer term.

Of course, sacrificing a part of a vacation which comes after a hard year of teaching, requires a great deal of will power. Nevertheless, it is necessary under many conditions, and it is becoming increasingly necessary because of the higher standards set for the teaching profession. Teachers who are in service now, and who want to maintain their position, and to advance to higher positions, must not neglect to make use of the opportunities so lavishly offered by the many teacher-training institutions in the United States. It is only by continued improvement that the teaching body can keep on raising its standards, and doing greater and better work for the youth of our country.

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EDUCATION

Education should not be a grind, but should consist of opportunities to get worth-while knowledge. Unless it is significant enough to be practical, it is not worth while. Let all education be intensely practical, and let us do our own thinking about it.—*Lewis Gustafson.*

Toymaking in the Industrial-Arts Shop

F. Clarke Hughes, Spokane, Washington

IT is doubtful if many teachers of shopwork realize to the fullest extent the value of toymaking to their classwork. All normal boys like to whittle and construct models and toys of all kinds. There seems to be a natural fascination in this direction which cannot be easily explained. During the past three or four years, the making of the little ship models became very popular. This seems to have stimulated model and toymaking to a very marked degree. Not only has the boy been affected, but doctors, lawyers, and business men have industriously whittled and carved away on these models until all hours of the night, getting as much pure delight from the work as could any of the younger boys in school.

To the industrial-arts teacher, the subject of toymaking offers a wealth of educational material which he will find in few other subjects. The field is unlimited in its breadth, and the possibilities are boundless to the resourceful teacher. Structural and aesthetic design are but two phases to be studied. Mechanical action, laws of motion, and physical principles, are subjects which must be worked out by either pupil or instructor, and many are the questions that are asked by the wide-awake youngster who is eager to learn the reason for certain causes and effects.

Far too many of our industrial-arts courses have been planned with the old-time educational ends in mind, forgetful of almost all other aims than the ones of perfecting the tool processes. These aims, though all very worthy in themselves, do not extend far enough to reach and appeal to the pupils of today, with their many other outside interests. As with all other schoolwork, our shopwork must offer projects and models which are both interesting and attractive to the individual pupil. If the interest appeal is what it should be, he forgets the tiresome routine and the unattractive parts of his work and like a sugar-coated pill, the whole is taken as a pleasant task. The boy who comes to his classwork, eager and alert for the next steps, is in little danger of wanting to quit his schoolwork because of any outside interests of a competitive nature.

With the pupil's interest secured and held, the instructor's work is made less difficult because he has few or no disciplinary troubles. Then too, the feeling which comes through the construction of a bright little bit of a toy for some eager little child, produces a moral affect on the individual which is far greater in its extent than one can realize.

Projects of the type shown in the drawings accompanying this article are so numerous, that, as has been said, the possibilities are without a limit. The subject of transportation alone offers hundreds of different boat models which always meet with great favor with the normal boy. The boat model may vary all the way from those made for use in the bathtub, to the graceful yacht model measuring several feet in length. Then there is the airplane, especially the flying models, which, with their fragile bits of construction, teach many things in the way of strength of materials, balance, etc. The automobile and railroad trains all have their place of interest in the boy's life and should be accorded a place in our courses of study.

Toys such as the two shown in the accompanying illustrations may be very easily made in any industrial-arts shop by boys of any age. The difference between ages being only a difference in workmanship in most cases. Perhaps if there is any marked difference at all in the matter of preference of ages for these two types of projects, the fifth or sixth grades might be chosen as best suited for the work.

When used with older boys, the suggested problems as shown in the accompanying drawings may be enlarged upon and extended to any length depending on the age of the pupils.

Toys such as the little auto models shown in Figure 1 are very simple to make, and small scraps of wood may be used for them, which would otherwise be thrown away. If these models are designed so that they come within certain ranges of sizes, the small blocks of scrap wood may be arranged according to sizes so that the proper pieces are readily found when needed.

The template, or pattern, for these auto models may be obtained by the pupils from clippings found in magazines or newspapers. The profiles may be traced on heavy paper or bristol board. The template may then be cut out and used to transfer the profile to the wood, after which the shape may be sawed out with an ordinary coping saw or on a power-driven band saw.

With a little additional carving, and some sheet-metal work, a very complete and realistic little model may be produced. Wheels may be either sawed from cylindrical stock or turned on a lathe. If the sharp corners are rounded a little, the real auto wheel will be more nearly approximated.

Figure 2 shows a locomotive model which is always popular with the smaller children. It is a project which is quite simple in its construction, and aside from the large cylinder used for the boiler, no part of the work presents serious difficulties for even the small boy. This boiler may be cut in lengths, from a long cylinder turned on the lathe by older boys, or bought at the mill in long stock sizes. Spools may be used for several of the parts on this project, because they are the correct size and shape.

If time and the ability of the pupils will permit it, the ratchet device may be used in connection with the back axle to produce an affect very similar to the sound of an engine when puffing. A small drop of solder will secure the ratchet disk to the wire axle. Staples are used to secure the axles to the wooden body. If these staples are driven down loosely they make very good bearings.

The finish best suited for all wooden toys is a gloss enamel or lacquer of bright, clear colors. In the case of the models described in this article, perhaps a light

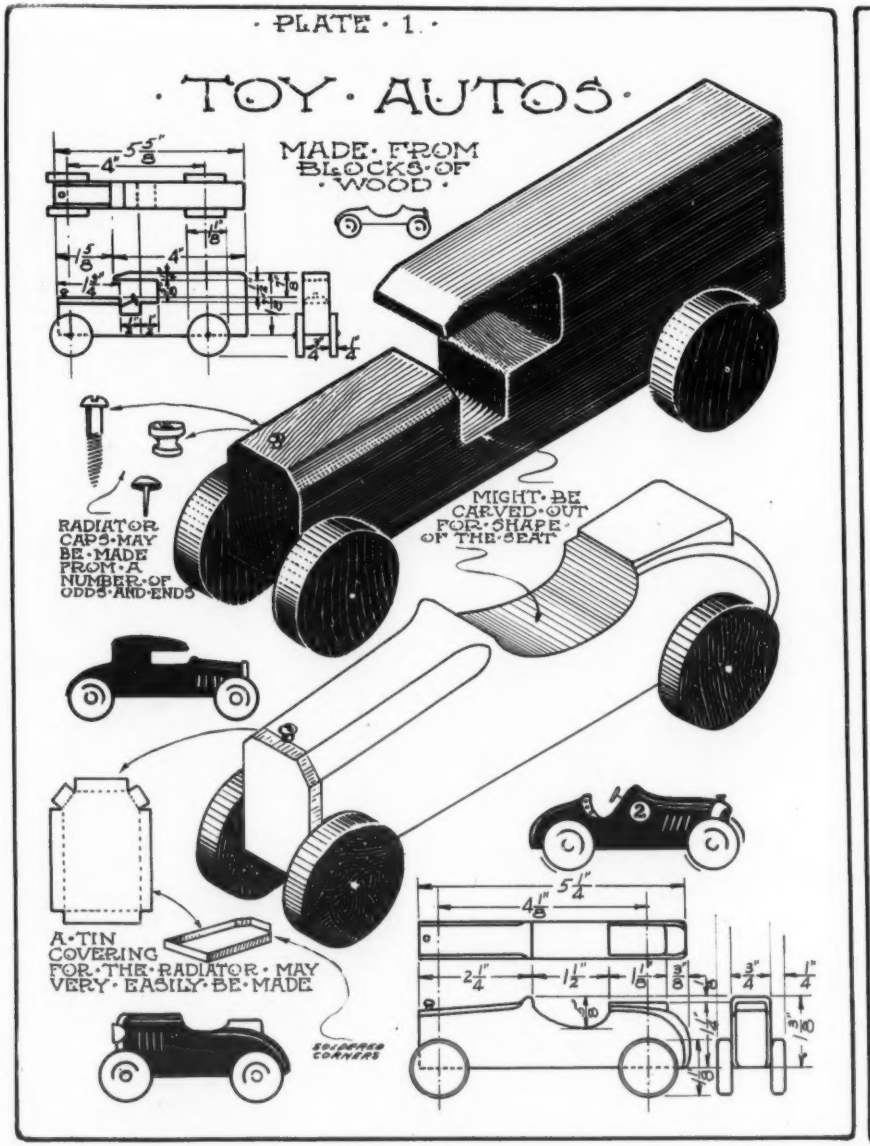

· PLATE · 1 ·
· TOY · AUTOS ·
MADE · FROM BLOCKS · OF · WOOD ·
RADIATOR CAPS · MAY BE · MADE FROM · A NUMBER · OF ODDS · AND · ENDS
MIGHT · BE CARVED · OUT FOR · SHAPE · OF THE · SEAT
A · TIN COVERING FOR · THE · RADIATOR · MAY VERY · EASILY · BE · MADE
ROUNDED CORNERS

FIG. 1

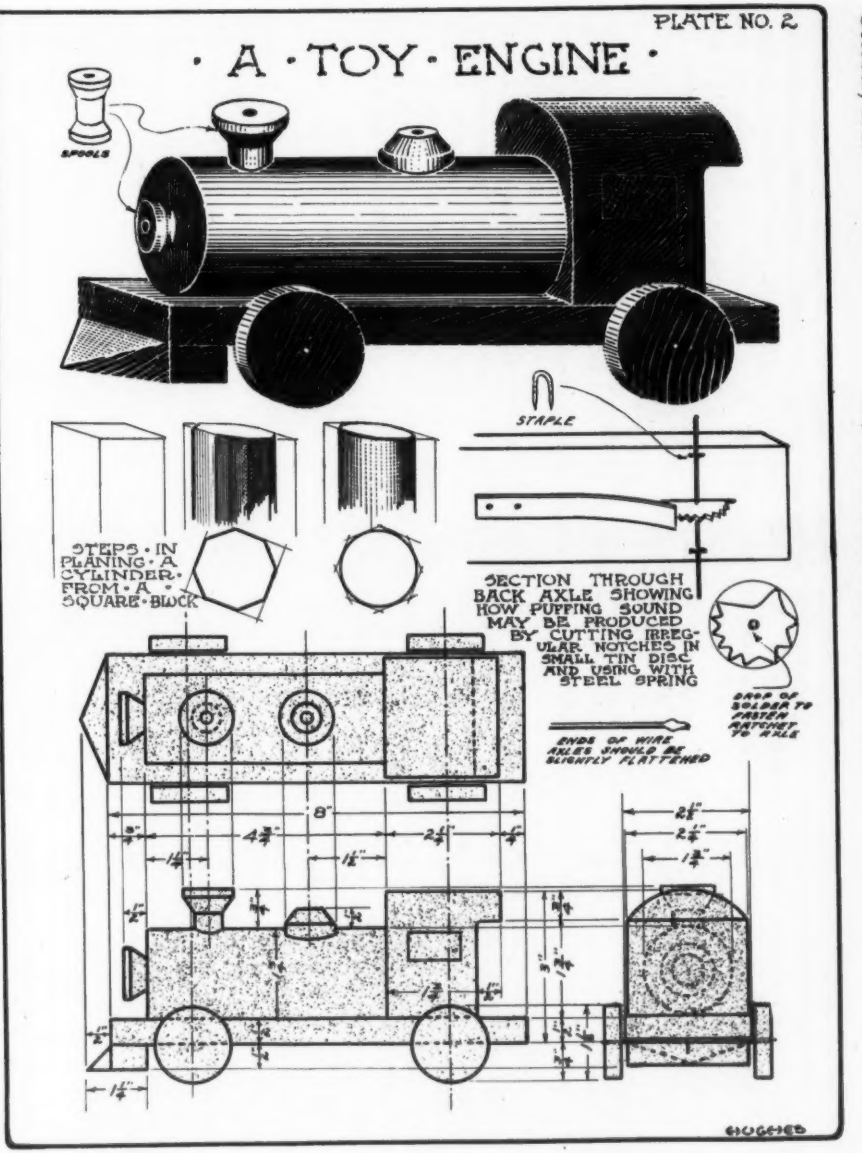


PLATE NO. 2
· A · TOY · ENGINE ·
SPOOLS
STAPLE
STEPS · IN PLANING · A CYLINDER · FROM · A · SQUARE · BLOCK
SECTION THROUGH BACK AXLE SHOWING HOW PUFFING SOUND MAY BE PRODUCED BY CUTTING IRREGULAR NOTCHES IN SMALL TIN DISC AND USING WITH STEEL SPRING
ENDS OF WIRE AXLES SHOULD BE SLIGHTLY FLATTENED
HUGHES

FIG. 2

gray would be best suited for the body color, with a few of the parts painted red or yellow and just a touch or two of black or dark blue to give relief.

It is always best to require the pupil to decide before he begins his painting just what colors he expects to use on his model, and in what proportions, otherwise only confusion of unrelated colors may be the outcome.

Problems of Design and Construction in Modernistic Furniture

Geo. Dally, Boys' Technical High School, Milwaukee, Wisconsin

THE history of the modernistic movement is not yet written. It is still in the making. Those who assume to know how it all came about are giving out information, in the form of short, current magazine articles, telling where and how this seemingly new idea originated. As a matter of fact, this modern trend, as depicted in our recently modernized furniture, is not altogether new. Most modernists agree on this point. If the idea is not originally American, it is at least contemporary.

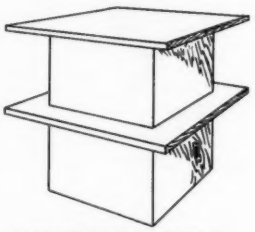
If we recall the achievements of Frank Lloyd Wright and Louis Sullivan, the erroneous idea that the modernistic movement is a foreign product will be dispelled. It truly reflects a modern American spirit, and it is not only used in the design of furniture, but its influence is being felt in other arts and crafts as well.

However, we are not so much concerned about the historical background of the movement. It is well, however, to analyze the movement from a practical standpoint for the purpose of bringing out a few important points of interest to the manual-arts instructor; and especially for those shop teachers whose day is all too full and who may, therefore, not have time to study the movement carefully enough to overlook pitfalls in their endeavor to become modernistic.

Probably too few manual-arts instructors advise their students as to whether a certain piece of furniture, which the student may wish to make, will be suitable or will fit into the home surroundings for which it is intended. If we have been lax in this matter, it is for the reason that we were probably making some of the small lacquered pieces of furniture, which may be used with almost any of our current furniture that has some period characteristics.

In selecting a modernistic piece of furniture as an example for classwork, we must not fail to take its future environment into consideration. Can you imagine anything more hideous looking than the center table shown in Figure 1, occupying a place in a room, having William and Mary furnishings, or some one of the other styles which decidedly carry the earmarks of period design? This is prone to happen if we start making individual pieces of modernistic furniture in our school shops without taking into account where they are to be placed. Just because a piece is pleasingly simple in construction, is no justification for making it, unless we know positively how it is going to be used, and are sure that it is not going to be misplaced. Our mission type of furniture was very often abused in this way, and boys were making this type of furniture in school shops, long after it was out of date and was discarded by the commercial world just because "it was easy to make."

FIG. 1.

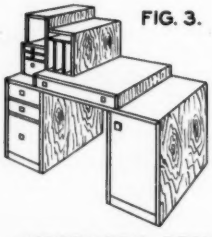


MODERNISTIC TABLE,
AN EXAMPLE OF SURFACE VOLUME.

FIG. 2.

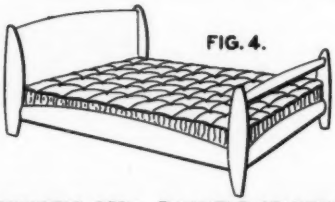
MODERNISTIC STAND,
ILLUSTRATES COMPRESSION AND STURDINESS.

FIG. 3.



MODERNISTIC DESK,
VOID OF PANELS.

FIG. 4.



MODERNISTIC BED: EXAMPLE OF INDIVIDUAL DESIGN
EMPHASIZING USE OF STATIC CURVES
AND STRAIGHT LINES.

George Dally.

The stand in Figure 2, which sometimes takes the place of our small tables, shows great durability and vigor. In its construction the miter, the hidden dado, and the rabbet joints should be used, instead of the plain butt joint which some employ in order to simplify the problem for the boy. It may be added, that this little modernistic stand offers many possibilities in the form of proper spacing as well as construction, and will look pleasing in a room furnished with other pieces which have the same elemental feeling. It is especially fitted for use at the side of an armchair.

Another point of interest which may well be taken into consideration, in connection with the construction of modernistic furniture in many cases, is the lack of squaring off surfaces by paneling. This particular characteristic is shown very well in Figure 3. Panels are avoided as much as possible when designing furniture of this type, the aim being to produce flat, unbroken surfaces, continuity of line, and surface volume.

The example of the bed in Figure 4 illustrates what might be accomplished when creating a project which employs a combination of curved and straight lines. This example brings out several important points which should not be overlooked when attempting to put one's modern "notions" into practice.

The sides of the head and foot ends are made with unbroken static curved lines. The same idea may be used when designing other pieces of furniture of this style. The whole scheme produces a feeling of its having been hewn from a solid mass; it possesses individuality, emphasizes volume, and shows durability without being actually too heavy.

Looking over furniture in modern design we find that the "modernistic designer" emphasizes utility, simplicity, sturdiness, structural harmony in proportions, and surface volume, rather than surface ornamentation. The last, results in plain unbroken surfaces, which tend to bring out the beauty of lumber. The modern designer accepts and shows in his design the influence which our airplanes, automobiles, skyscrapers, small homes, and apartment buildings have played in shaping our destinies and which help to produce an environment that demands a type of furniture depicting speed, compression, and directness that is symbolic of our modern life. Design and construction based on this knowledge is the next step in the integration and unification of the twentieth-century American tendency. It offers the instructor and student a greater freedom for self-expression, because it does not link its creator to any of the traditional ideas so often found in the make-up of our past or present-day furniture. It is not in any way related to either the autocratic styles of the past nor to the superlative frills of the present.

As public-school instructors, it is our duty to keep abreast of the times; therefore, we should make it our duty to understand the characteristics of this modern movement and should go forth to meet the problems involved, rather than to wait for them to be thrust upon us.

Outlines and Demonstrations in the Industrial-Arts Shop

John T. Williams, Compton, California

THE industrial-arts teacher is charged with the duty of turning out groups of boys who can *think as they work*. If this is not accomplished, industrial-arts work loses its greatest objective. Boys who can think of what they are doing, while they are doing it, have acquired one of the most important assets in life; i.e., the power of *concentration*. Such things as accuracy, carefulness, system, economy, efficiency, and pride in the undertaking, are all dependent to a greater or less degree upon concentration. In order to get a pupil to concentrate upon his work, his interest must be aroused, and to arouse interest in this day and age, and then *hold* it, is an art. To do it, the teacher must be a "live wire," and on his toes every minute. He must be able to keep a few paces ahead of the procession.

To impart knowledge to any group of boys, and to start them to thinking, is comparatively easy. The great trouble, however, in industrial-arts shops is that not enough knowledge is imparted. After the first few explanations, or demonstrations, at the beginning of the school year, and after the pupils have been fairly well started on their projects, some instructors think it a shame to interrupt "the good work" by stopping the class to give more demonstrations. This is the beginning of trouble, because the longer the pupil is allowed to proceed without added information, the more he believes that he has learned all that there is to the work, and as time progresses the workmanship becomes poorer and poorer. Soon a lack of interest becomes apparent, and after awhile all hope of a successful year in the shop disappears.

In order to insure sustained interest and a smoothly running organization in the shop, the teacher should devote a small fraction of each shop period to a demonstration of some sort. A simple method to follow is to have a list of brief outlines, from which can be chosen the one most suited for any particular day, or lesson. These outlines could be great in number, although this is not absolutely necessary. One for each lesson is sufficient. For the ordinary woodshop they would fall into three main divisions: (1) The care and use of tools, (2) the methods of making projects, and (3) wood finishing.

A list of outlines follows. They are brief, but the teacher can expand or shift them to suit his convenience.

No. 1

(Note: This is to be used at the first meeting of teacher and class. It can be delivered in the form of a brief lecture.)

A. *Introduction*

Greetings by the teacher. The idea of the shop explained.

B. *The Purpose of Manual Training*

Coordination of mind and body.	System.
	Work.
Accuracy.	Economy.
Carefulness.	Pride in an Undertaking.

C. *The Care and Use of Tools*
The cost of tools.
How they are paid for.
The different tools explained.

D. *Survey of the Shop.*
The benches and their numbers.
The toolroom.
The method of obtaining lumber.
The paintroom.
Costs of materials, and allowances.

E. *Projects*
To conform with the course of study.
Blue prints.
Models.
Patterns.
Photographs.

F. *Rules and Discipline*

No. 2

Laying out Instruments
1. The Straightedge.
   Explain how to level the face of a piece of stock. Using on edges.
2. The Square.
   Explain how to hold. Its uses.
3. The Ruler.
   For measuring only.
4. The Marking Gauge.
   How to hold and how to use. An exercise in the use of this tool is good.

No. 3

Sawing
1. Explain "grain" in wood.
2. Crosscut and ripsaws. Uses.
   Shape of teeth in each.
   How to start a saw.
   Position for sawing.
   Control of saw. (Staying on a line.)
3. Backsaw.
   Finer teeth.
   Where used.
   The bench hook.
4. Coping Saw.
   For sawing curves.
   For thin, soft wood.
   Toymaking.
5. Turning Saw.
   For larger work than the coping saw.
6. Compass Saw.
   Explain its many uses.

No. 4

Planing
1. Explain "grain" (again) and how to plane in the right direction.
2. Kinds of Planes.
   Jack plane. Size, shape of knife, and use.
   Smoothing plane. Same.
   Jointer. Same.
   Block plane. Same.
   (Other planes, if necessary.)
3. Management of a Plane.
   Explain the different parts of a plane.
   How to hold a plane.
   How to adjust a plane.
4. Planing on the edge of a board.
5. Planing the end of a board.
6. Planing a bevel or chamfer.

No. 5

Chiseling
1. What is a chisel?
   Similar to a small plane knife on a handle.
2. Uses.
   Getting into sharp corners.
   Indispensable in making lap joints, mortise-and-tenon joints, etc.
3. Explain how to hold and use a chisel.

No. 6

Spokeshave and Drawknife
1. The Spokeshave.
   Similar to a short plane knife with a handle on each end.
   Used on curves and in places where the plane will not go.
   How to hold.
   Demonstrate use on curves.
2. The Drawknife.
   For taking off large quantities of stock in preparation for planing.
   How to hold correctly.
   Demonstrate use.

No. 7

Boring
1. Bits and Drills.
   Sizes, method of numbering, etc.
2. The Brace.
3. Demonstrate how to bore a hole correctly.
4. Make a handle by boring holes, and sawing between them with a compass saw.
5. Drill hole for a screw and use countersink.

No. 8

Nailing and Screwing
1. Nails and Brads.
   Kinds and sizes.
2. Hammers.
3. How to drive a nail.
4. Screws.
   Kinds and sizes.
   Drilling holes and countersinking.

No. 9

Matching
1. Surfaces.
   Straightedge used diagonally.
   Method of planing.
   Fitting, so that no cracks show.
2. Edges.
   Straight edge.
   Jointer gauge.
3. Dowels.
   Dowel pointer.
   Bit gauge.
4. Glue.
   Kinds.
   Preparation.
   Use.

No. 10

The Wood File
Kinds.
Flat, half-round, rat-tail.
Explain uses, and how to manipulate them.
Stress to be laid on when *not to use the file.*

No. 11

Sandpaper
Show various grades and explain numbering.
Explain uses.
Explain when to use sandpaper.
Give out *sparingly.*

The "Methods of Making Projects" can best be outlined by each individual teacher. Where there is a course of study to conform to, the projects are definitely determined, hence outlining a series of projects here would be of little value. Wood finishing, however, is quite the same throughout all schools, therefore a few outlines on this work will be offered.

No. 12

Staining
1. Explain briefly the difference between stain, paint, enamel, shellac, and varnish.
2. Show how to make a *golden-oak stain.*
   Light: Raw sienna (in oil) mixed with turps.
   Medium: Add burnt umber to the light golden oak.
3. Demonstrate application of stain, and wiping off.

No. 13

Fillers
1. Explain when a filler is necessary.
   Pores in wood.
2. Make a filler.
   ½ cup silicate
   1 cup cornstarch

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THE INDUSTRIAL-ARTS MAGAZINE,
OCTOBER, 1929

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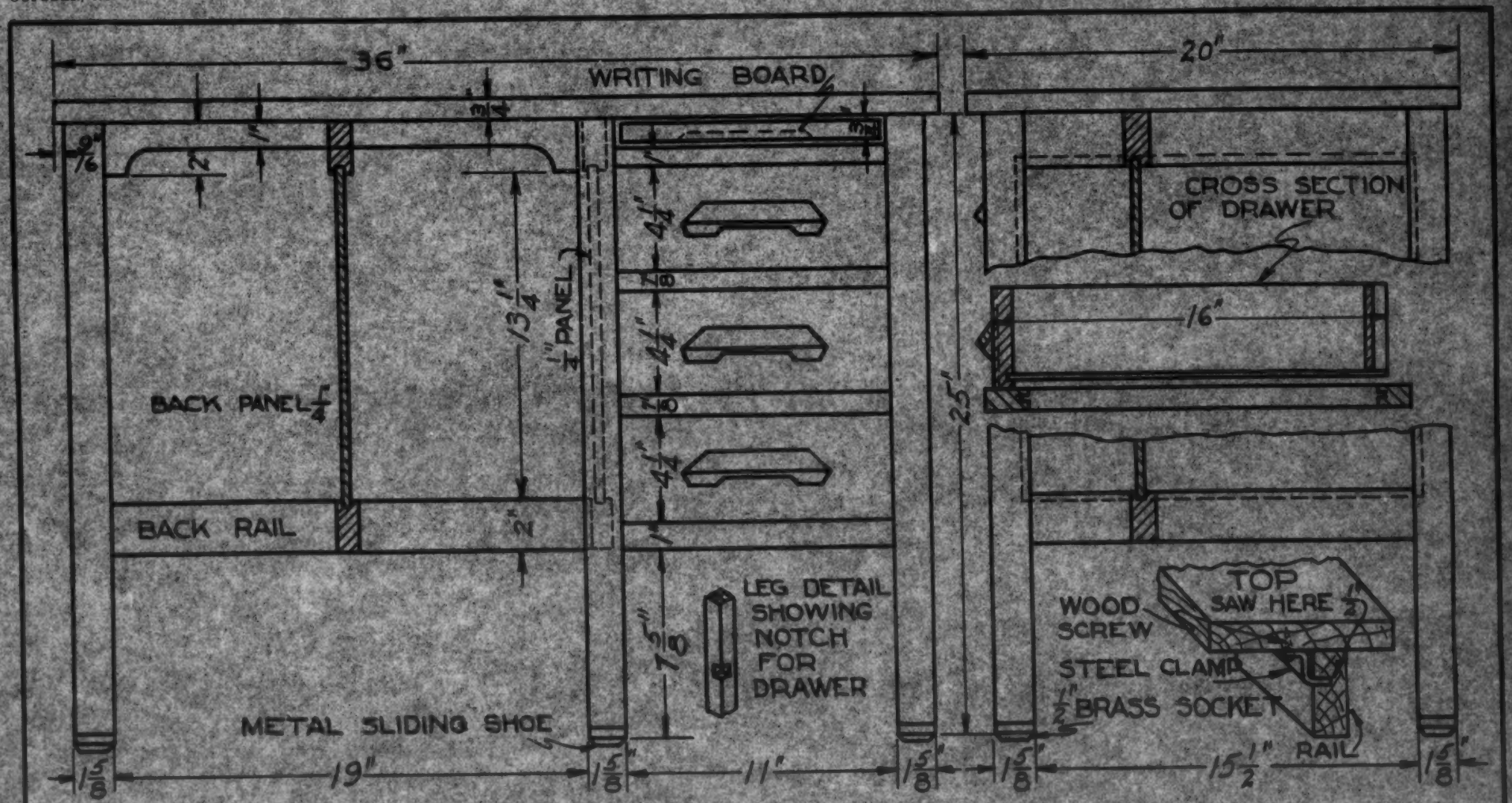

TYPEWRITER DESK

Designed by Carl V. Lindeman, Paw Paw, Mich.

For Description See Page 388, Industrial-Arts Magazine, October, 1929.

TRACING SUPPLEMENT No. 152.
THE INDUSTRIAL-ARTS MAGAZINE
OCTOBER, 1929

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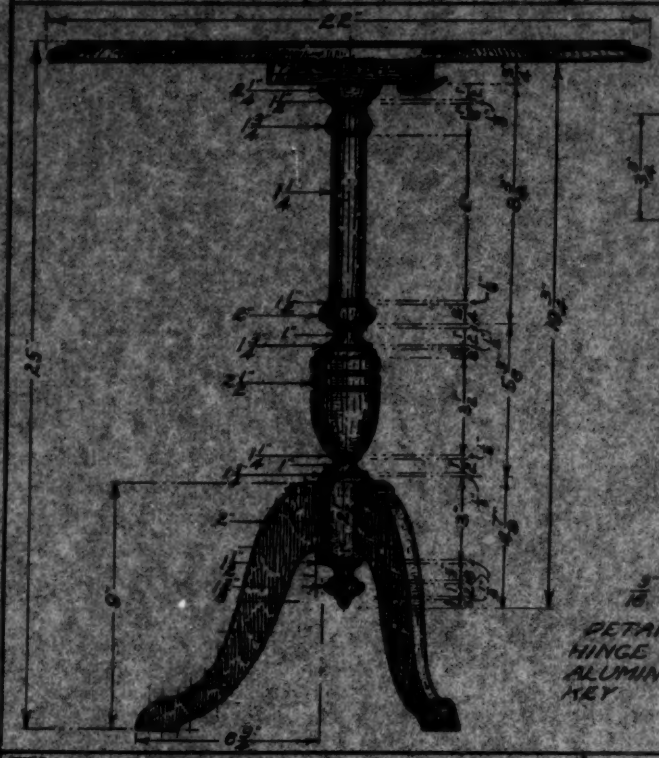
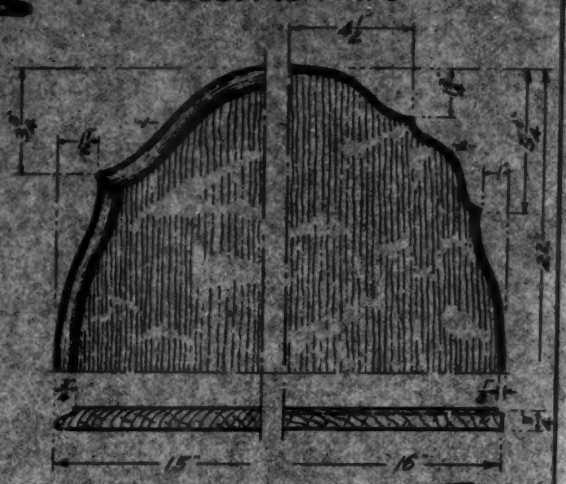
ADV. WOODWORK
CLIFFORD B. SMITH

TILT-TOP TABLE

PROJECT INSTRUCTION SHEET — A-102



SUGGESTED TOPS



THE PROJECT— The Tilt-top Table is an excellent project as a class production job, with group foremen or inspectors. A lacquer finish is recommended.

The following Unit Instruction Sheets are to be used as needed:- Squaring-up stock, W-1;- Curved Edges, W-20;- Band Saw, W-89;- Wood Turning, W-100;- Dowel Joint, W-112;- Mortise and Tenon Joint, W-120;- Sandpaper, WT-37;- Lacquer Finish, F-7;- Files & Rasps, WT-35.

MATERIALS— 2 1/2 x 2 1/2 and 3/4 white wood, 3/8 doweling, hot glue, 1 1/4-#10 F.H. bri. screws, aluminum catch, #8 galv. iron wire.

TOOLS— Speed lathe, lathe tools, jointer, band saw, mortising machine, jack plane, try square, steel square, spoke shave, half-round file, sanding machine, bar clamps, sandpaper, circular saw.

DIRECTIONS— 1- Make out a bill of material on your working drawing.

2- Cut piece for the column 2 3/4 x 2 3/4 x 21. Rough down to 2 1/8 diameter. Turn to shape. See W-100. Sand.

3- Glue up stock for top. Use dowel joint. See W-112.

4- Band saw legs. Be careful that the grain runs lengthwise with the leg.

5- Plane face side to each. Work to curved edges with spokeshave, chisel and gouge. See W-20. A half-round file might be used sparingly; See WT-35. Cage and plane to thickness. Sand.

6- There is a sheetmetal pattern for the mortises. Wrap this around column in the proper place and trace the outlines of the three mortises. See Fig. A- Set mortising machine and cut.

7- Cut tenons on legs to fit. See W-120.

8- Glue legs to column with hot glue. Three handscrews placed as shown at -B- with two or three strands of wire twisted tightly around will serve to hold legs in place.

9- Surface plane top and obtain thickness. Sand.

10- Layout outline of top and bandsaw.

11- Layout the ogee moulding and rough out as much as possible on circular saw. Finish by hand with carving tools.

12- Plane and nail the four I strips together as shown at G. Have center piece with 5/8" hole, fit snugly in frame. Drill for pin. Cast aluminum catch. Fasten to top, glue on to column. Lacquer. F-7

QUESTIONS— How many holes would you drill for each wood screw? How would you determine their size? What would you do with the file on the back stroke? What motion should you impart to it on its forward stroke? In making a mortise and tenon joint, the mortise should be cut first. Why? Of what use is a shoulder on a tenon?

Designed by Clifford B. Smith, Buffalo, N. Y.

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THE INDUSTRIAL-ARTS MAGAZINE,
OCTOBER, 1929

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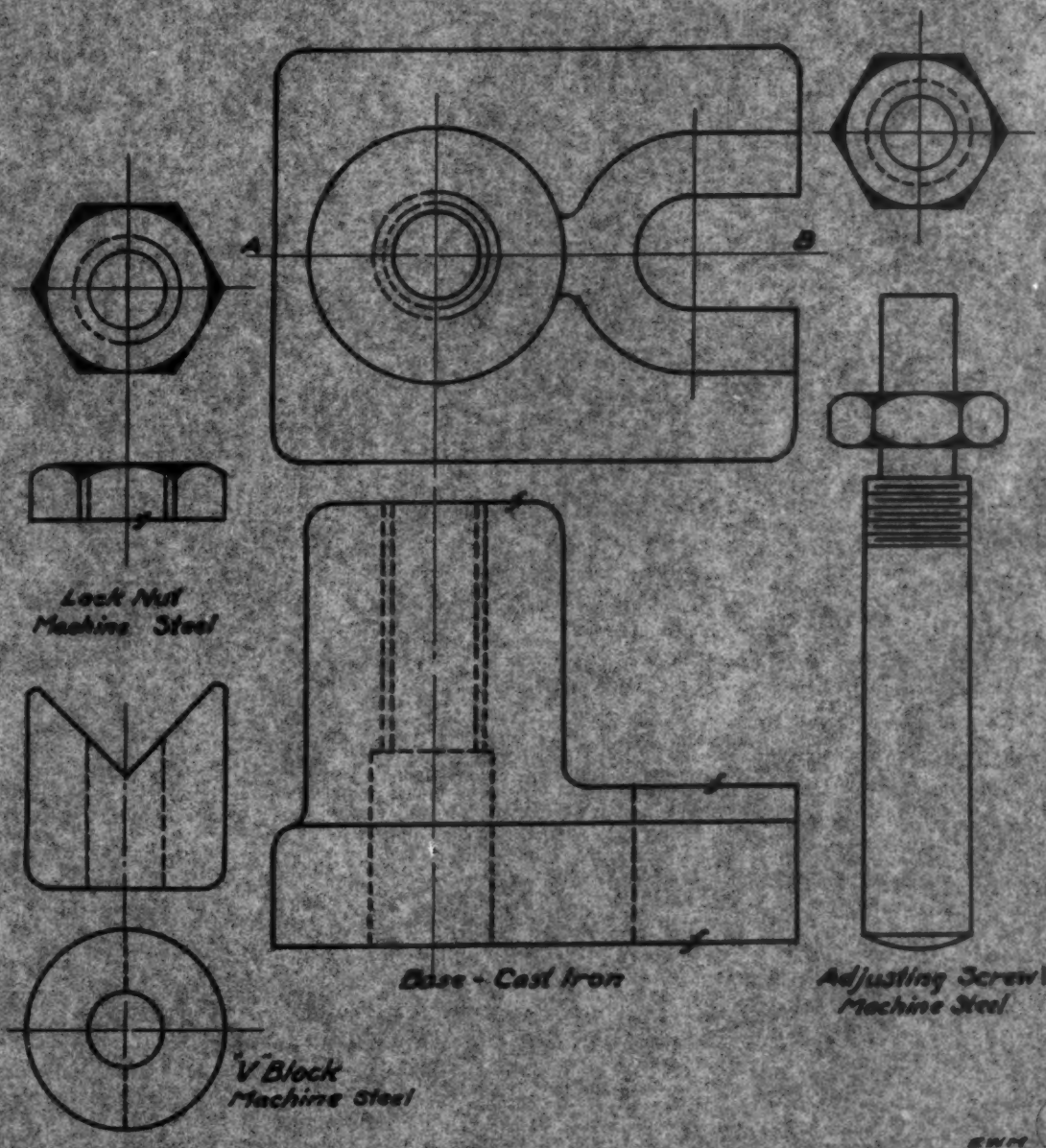
MECHANICAL DRAWING

Contract 10

Note:

Read the references given out by your instructor for this contract. Use them when you are doing your work.



Designed by E. W. Mauer, Evansville, N. Y.

For Description See Page 188, Industrial-Arts Magazine, October, 1929.

TRACING SUPPLEMENT No. 154
THE INDUSTRIAL-ARTS MAGAZINE
OCTOBER, 1929

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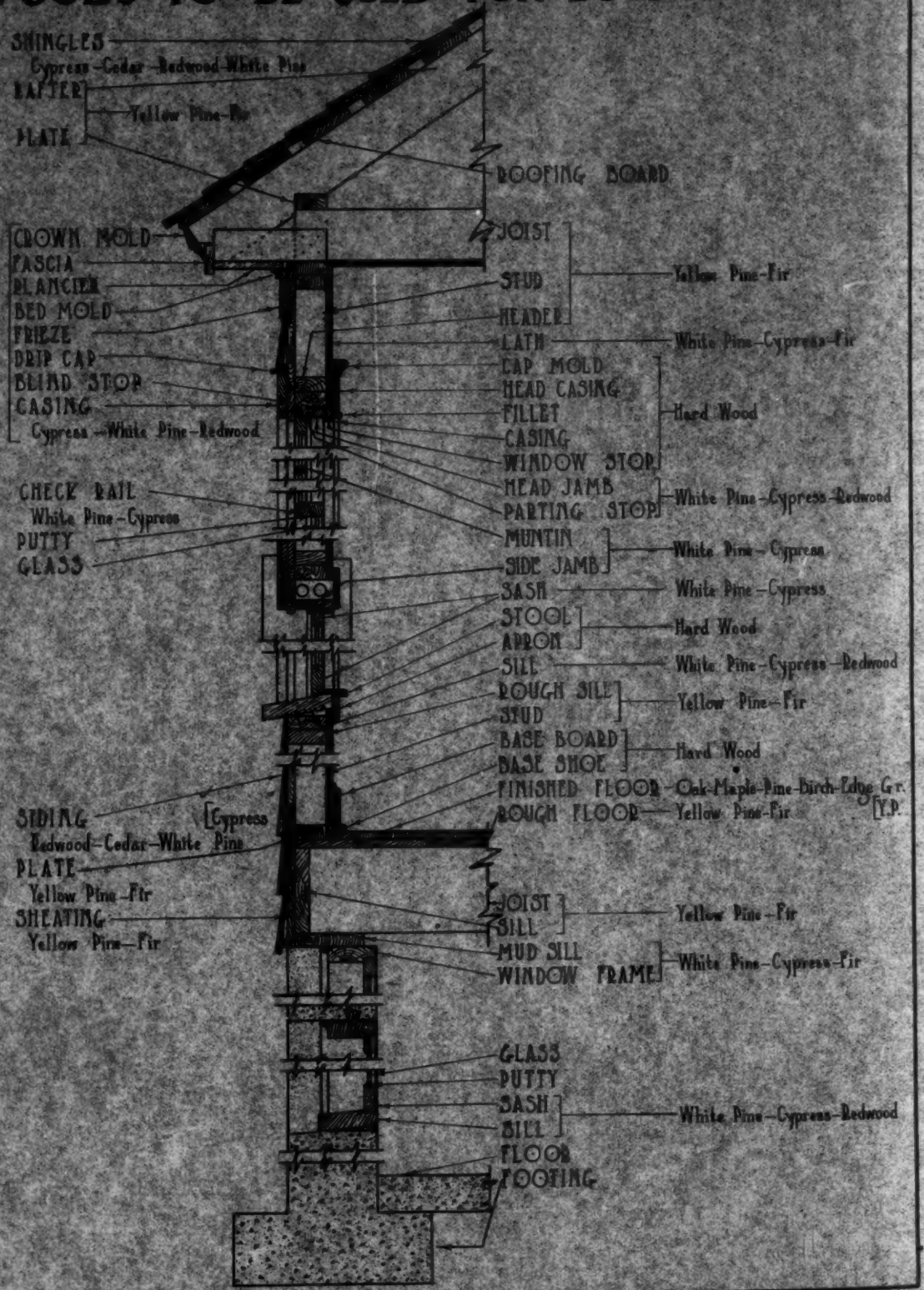
COMMON BUILDING MEMBERS & WOODS TO BE USED FOR ECONOMY



NAMES AND MATERIALS FOR COMMON BUILDING MEMBERS.

Submitted by H. H. Robinson, Augusta, Kans.

½ cup stain powder, the desired color
½ cup boiled linseed oil
Add turpentine to obtain a pasty consistency.
3. Demonstrate application of filler.
Rubbing across the grain, as well as with it.

No. 14

Shellac
An excellent filler on woods with very fine grain.
Applied after stain is thoroughly dry.
Must be applied rapidly and smoothly.
Demonstrate application of shellac.
Steel-wool the first coat when dry, and apply a second coat, which will remain smooth and glossy.

No. 15

Varnish
Uses and application.
Rubbing down.
Difficult to handle in a small shop, especially if very dusty.

No. 16

Enameling
Application of flat coats.
Explain "flat" and how it is made.
Method of applying enamel.

No. 17

Painting
Outside and inside paints, and "flats."
Explain preparation, and reasons for same.
Demonstrate application of paint.
Correct places to apply.
Brushing out.
Not too heavy.
Stress the importance of good painting.

In conclusion, let it be said that these outlines and suggestions are offered solely as *helps*, to the teacher who is too busy to systematize his knowledge; or for the one who has suffered a slump in his work and needs a tonic to bring it back to normal. Remember, the teacher can expand, or shift, these outlines to suit his convenience.

Advertising the School Printshop

Adolph L. Juten, Duluth, Minnesota

GOOD printing can be seen wherever we look. Every day thousands of dollars are spent on printing that is left in our mail boxes, given a fleeting glance, and is passed on to the wastebasket. In fact, good printing has become so common to all of us in this day of printed advertising circulars that we give it but slight thought.

In order that the printing done in the junior high school be recognized as such, we have found that a line of six-point type located in an inconspicuous place on each job stating, "Printed in the East Junior High School Printshop" does not mar the appearance of the job. Such a line will be found quite essential as a "tailpiece" on many jobs and will add a finishing touch. Even on small jobs, such as tickets, a six-point light-face type will not be obtrusive, yet it will let the parents and people interested in your school know that your shop is really accomplishing something.

At the present time our printing classes are in the midst of a program of education. We are endeavoring to give the entire student body of the school a knowledge of the work that is being done in the printshop. We are using a series of stock cuts on printing and making them up into calendars. Each calendar describes briefly some point in the history of printing or one of the operations necessary to the completion of the jobs. Each month these calendars are placed on the teachers' desks where every student will see them, one is given to every member of the printing classes, and the others are sold to the students of the school.

To further round out this educative program, we have used these same cuts to illustrate and have printed a small booklet on the subject of printing and discussed such topics as: Invention of Printing; Originating Italic Type; Benjamin Franklin; Typesetting; Taking Proofs; Locking Up; Platen Press; Cylinder Presses; The Linotype; A Good Printing Job, and Printing at East Junior High. This last topic contained statistics on the equipment and work of the shop. These booklets were distributed to the student body and were much appreciated. A page follows.

LOCKING UP

The job should not be locked up until it is proofed, corrected, and O.K.'d. When the job is ready to be locked up it is placed on a flat table called the imposing table. A chase or steel frame is then placed around the job and pieces of wood, called furniture, placed around the job to take up the space between the job and the chase. Then quoins or wedge-shaped pieces of metal are placed at the top and on the right sides of the chase near the job and locked up with a key.

The eighth-grade English teachers have also cooperated with us in the matter of using printing subjects for English compositions. We attempt to cover, by means of explanations, illustrations, and tours, every phase of the printing trade. After such lectures or tours the boys are expected to write English compositions on such subjects as: Cylinder presses, papermaking, the linotype, halftones, and many others. Some of these compositions are very good and the fact that they are read in the English class has aroused the interest of the girls in the printing classes. It is not unusual for a group of girls to come into the printshop before or after school and say that they want to see the shop they have heard so much about.

Many of the compositions have been of such a caliber that they have appeared in the school paper where they are read by students and parents.

These methods of placing before the student and those interested in your school, the work of the printshop not only arouses the interest of the students but also indicates to the academic teachers and the parents that the shop in the junior high school is not primarily for the purpose of turning out mechanics, but also for the broadening out of the general education of the boys.

PROBLEMS AND PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in woodworking, turning, patternmaking, machine-shop practice, sheet-metal work, forging, foundry work, auto mechanics, auto electricity, electricity, architectural and mechanical drafting, printing, bookbinding, concrete work, farm mechanics, home mechanics, and other lines of industrial-arts work are desired for consideration.

TYPEWRITER DESK

Carl V. Lindeman, Western State Teachers College, Paw Paw, Michigan

(See Supplement No. 151)

The typewriter desk presented herewith has proved to be a very popular project. It is valuable because it contains most of the common forms of construction in cabinetmaking, and is, when finished, a very useful project.

It may be made of quartered oak, though walnut or any other kind of hard wood may be used. One-quarter inch, three-ply panels were used throughout. The six legs are first squared and cut to size. The rails or stretchers are next cut and grooved for the ¼-in. panel. The mortise-and-tenon joints are all made and fitted, taking care to see that all tenons are marked to correspond with the mortises, as a misfit will complicate the assembling. Next, the drawer slides should be constructed and assembled. The legs should be notched for the drawer slides. This makes a better and stronger construction.

After all parts are cut and ready for assembling, it is better to assemble the project in two sections. The portion with the drawers should be assembled completely. The panel and legs on the left-hand or outer-leg section may next be put together, thus making it easy to glue and handle; the back and front panel and rails may next be fitted and glued together. The top may be glued together if solid wood is to be used or if a veneered top is to be used, a very thin piece of wood should be glued to cover the end grain. Desk-top fasteners should be used to fasten the top. The sectional drawing shows the construction of the drawers. After the desk is fully assembled, it may be finished or stained to suit the maker.

A CONTRACT FOR MECHANICAL DRAWING

E. W. Manzer, Supervisor of Manual Arts, Bronxville, New York

(See Supplement No. 153)

The contract method of teaching manual-arts subjects has been used with enough success to pronounce it one of the outstanding means for motivating subject matter and for creating a keen interest in the project that is undertaken. It forms a challenge to the student of high or low mental capacity, but still leaves ample room for the selection of a task that is within the ability of the contractor. If a student of fair ability feels that he cannot master the A or B contract, he may elect to do the C contract. The results of his efforts may be equal to those of the student who elects to do the A contract, but the record of his accomplishments in terms of A, B, or C contracts shows conclusively whether he has earned the same rating as the student who has accepted the challenges set forth in the higher forms of contracts. For example, John Smith, a student who always does good work in the C contracts has never undertaken the task of a B contract. He has been contented to work along on the line of least resistance. The grade he has received for his actual drawing is equal to the grade that Henry Jones has made on his A contracts; the technique of each boy being on a par. When the final grade is turned in, Henry Jones will stand higher in terms of *accomplishments* than John Smith, because he has undertaken more difficult tasks. He deserves a higher rating because of his initiative, his eagerness to tackle bigger jobs, and his ability to fulfill his contracts. *Achievement* is therefore superior to *technique* and is justly rewarded when the contract system is used.

A point system that may be attached to any contract will tend to make the "just get by" student accept more difficult tasks and therefore help him to build up a better technical background, and at the same time, build up a character that will cope with the more advanced problems that come in college work or in actual life situations.

"Getting by" is not so easy when the point system is used, because the student knows just what he must accomplish before the end of the course. Personal pride also works great wonders in the selection of contracts and in the type of work handed in as part of the contract requirement. The commendation from classmates and instructor is another positive force that has much to do with the motivation of the instructor's plans. Occasionally, a member of the class who has been doing too many easy contracts is taken for a verbal "ride" by his classmates. The results are favorable in most instances and soon the student is taking on more advanced work.

The contract for mechanical drawing shown in this article is one that has been used with very satisfactory results. It has been instrumental in "putting across" subject matter without the usual direction or hand-it-down method. It is set up in the form of a challenge and the resulting satisfaction that comes to the student when the contract has been finished is proof that something has been learned.

At any time of the year, or semester, a student may determine just where he stands in terms of accomplishment. The bulletin board has a progress chart that shows where each student is standing in terms of technique and in terms of contract points. If a student has made an average grade of 82 in technique but has had the courage to tackle the challenges set up, he has a standing that is superior to that of the student who has an average of 90 in technique but has only done his work in the C contracts.

The ability to master the A contract is, of course, the real challenge and it gives the outstanding members of the class plenty of work to do in order to make the grade. The outside work, or elementary research, is most valuable, for it teaches them the "how" of getting material for their other studies as well as for their mechanical drawing. The point system rewards their efforts thus expended.

Mechanical Drawing

Contract 10

Object:
To apply the information given in the reference reading and to test for general knowledge and ability in the technic of mechanical drawing. (References are to be obtained from the instructor.)

Problem: (Choose one of the three contracts)

C Contract. 10 Points

You are given a detail drawing of a supporting jack. All dimensions have been left off. *You are to make an assembly drawing of the jack,* taking the dimensions from the sheet by means of the dividers.

B Contract. 20 Points

From the information given, make a *half-section assembly*

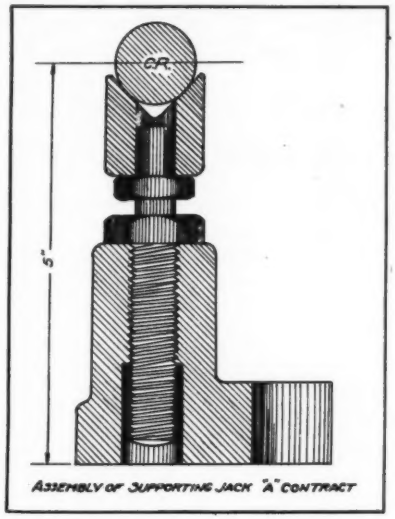
of the supporting jack. The section is to be a front view of the jack taken on line of center A-B. The adjusting screw is to be elevated and locked with the lock nut to support a 1-in. diameter shaft. The center of the shaft is to be 5 in. above the base line of the jack. Show the shaft in section. Use proper convention for the shaft. The jack is made of cast iron.

A Contract. 30 Points

In addition to the specifications set forth in contract B, hand in a written formula for as many kinds of threads as can be found in the reference books. List the advantages and the disadvantages of the threads. Draw all threads and properly letter the formula. Hand them in with the drawing.

Method:

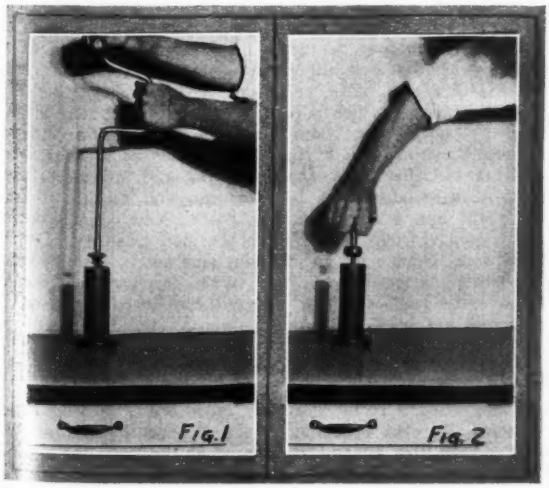
Study your problem. Know what you are going to do before setting out to do it. Try to get a clear mental picture of the jack. Assemble the parts in the mind's eye, then translate the mental picture to the drawing paper. If you encounter some difficulty in "seeing" the jack assembled, start with the most important part and build up a graphical picture along with your mental picture. *Read* your drawing so that you obtain a clear picture. *Think*, then *Do*.



SAMPLE OF STUDENT'S DRAWING. CONTRACT A

Conclusion:

If you elect a contract you must "stick to it." See your job through. Be fair and square with yourself. One cannot afford to cheat anyone—least of all oneself. Forget about outside activities when you are engaged in doing some other task. Make time count in your drawing just as you would want it to count in the 100-yard dash. *Do your best* and then you can say you have been *on the square with yourself.*

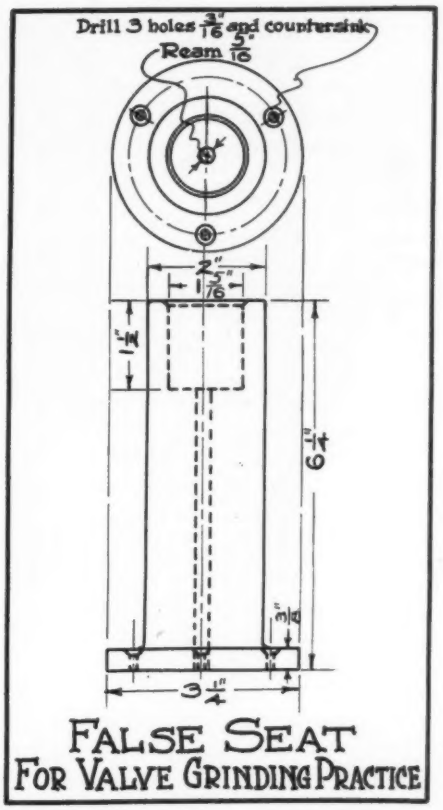


FALSE SEAT FOR VALVE-GRINDING PRACTICE

R. F. Jennings, South High School, Minneapolis, Minnesota

The auto-shop instructor knows that one of the most important jobs done on the automobile engine is grinding valves. He also knows that it is frequently impossible to provide enough engines needing valve grinding to give all of his pupils sufficient practice at the time this subject is being covered.

Figure 1 shows a simple casting of gray iron that is used as a false seat for practice in valve grinding, A number of different valves for standard makes of light cars are of suitable dimensions to use in the false seat.



With a casting for each student in the class, a careful sample job of valve grinding can be done. The device can be used for successive grinding jobs by scraping a low place in the seat with a knife or bearing scraper. By grinding a little off the top, the seat can be repeatedly reamed to the proper angle as shown in Figure 2.

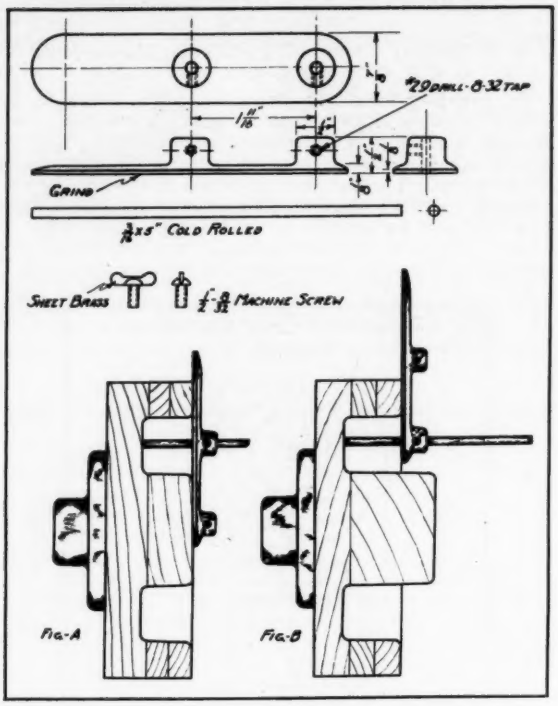
In addition to the operations shown, practice can be given in the use of 15- and 75-degree seat-narrowing reamers.

Twenty of these teaching devices have been in use in the writer's shop for nearly a year, and have proved very satisfactory. They are especially to be recommended for giving preliminary practice before allowing inexperienced students to work on actual repair jobs on automobiles.

A HANDY DEPTH GAUGE

Paul E. Jaquish, Arthur Hill Trade School, Saginaw, W. S., Michigan

Many industrial-arts and trade classes in the schools are handicapped, because those who are taking the courses are not permitted to make anything that is of practical value. One of the first questions asked by some students upon entering the patternmaking class is whether or not they may make this or that piece of furniture. When told that the class must hold strictly to making patterns, some of these students lose interest because they have not yet learned the fascination of real trade work.



HANDY DEPTH GAUGE, DESIGNED BY PAUL E. JAQUISH, SAGINAW, W. S., MICH.

It is natural, however, for a boy to wish to make something to "show the folks." A pattern and core box may look nice, but the boy does not see their practical value. For that reason, efforts should be made to introduce projects into the various courses which have a practical application and can be used daily.

The patternmaker on the job makes many of his small tools. For this reason, the making of tools has been made a part of the course. Some of those that were introduced are: knife, scriber, centering block, depth gauge, fillet tools, and panel gauge.

The accompanying illustration shows the size, construction, and application of the depth gauge. The pattern is made for an aluminum casting. The face and outer edge of the casting are sanded on the disk sander. The remainder of the casting is filed and scraped. It is then sent to the machine shop where it is drilled and tapped. The bosses are drilled to take a ⅛-in. rod, and the sides are drilled and tapped to take an 8–32 screw. Rods of various lengths may be used depending upon the size of the job.

The thumbscrew can be made in the shop by using a roundhead machine screw and a small piece of brass. The wing may be shaped to suit the individual. After the wing has been cut out, it is soldered in place, the excess solder being cleaned off.

Figures A and B illustrate the application of the tool to lathe jobs. Students are instructed to stop the lathe when measuring depths, but it is not always done. This depth gauge with its round rod is much safer than a flat, sharp-cornered shrink rule if used for making depth measurements when the lathe is turning.

The tool is also handy for the instructor when checking jobs. He can have any number of them set to different depths and save much time. It is a very handy tool to have in any turning kit.

Every student appreciates making a tool that he can take home, or use later on in the trade.

A FISH-BOWL STAND

Gerald A. Boate, Seattle, Washington

The fish-bowl stand shown in Figure 1 presents little difficulty for the eighth-grade boy. The legs are made of ⅛ by

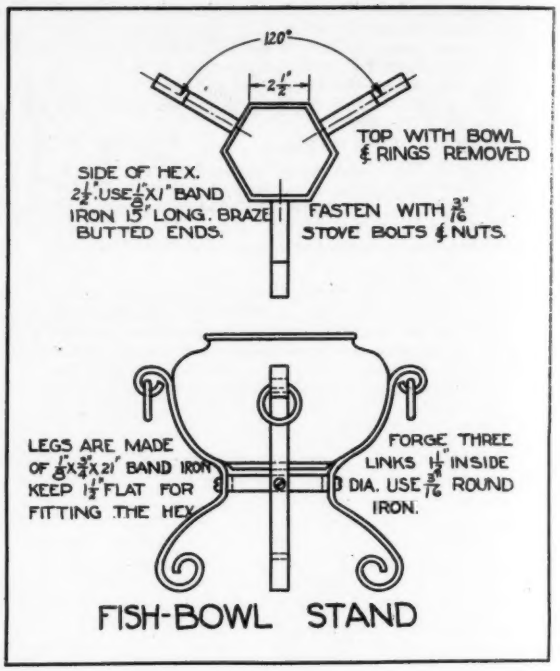

120°
2½"
TOP WITH BOWL & RINGS REMOVED
SIDE OF HEX. 2½". USE 1" X ⅛" BAND IRON 15" LONG. BRAZE BUTTED ENDS.
FASTEN WITH 3/16" STOVE BOLTS & NUTS.
LEGS ARE MADE OF ⅛" X ¾" X 21" BAND IRON KEEP 1½" FLAT FOR FITTING THE HEX.
FORGE THREE LINKS 1½" INSIDE DIA. USE 3/16" ROUND IRON.
FISH-BOWL STAND

FIG. 1

¾ by 21-in. band iron. The holes in the legs must be central and in the same vertical plane, so that the legs will stand vertical when they are assembled. The holes are drilled for 3/16-in. r.h. stove bolts. The material for the hexagonal ring is ⅛ by 1 by 15-in. band iron. A hexagon with 2½-in. sides should be laid out full size on a flat piece of board to serve as a pattern for bending the angles. To lay out this hexagon, set the points of a pair of compasses 2½ in. apart and draw a circle on a piece of board. Then with the compass points set as for drawing the circle, step off the hexagon. Mark this in heavily with pencil. While the 15-in. piece of iron is flat, mark with square and red pencil every 2½ in. across one face. Clamp the piece in the jaws of a metal-working or machinist's vise so that the first red mark will be even with the top of the vise jaws. Using a 1½-lb. machinist's hammer, bend the iron carefully until the angle is the same as that shown on the board. Repeat this procedure with each side, until the hexagon is formed. Now file the inside of the pieces where the joint comes until the two surfaces fit together, and wrap a wire around the outside to prevent the free ends from springing out of place. The hexagonal ring should now be stood with the joint downward over a gas or clean forge fire. If a forge is used, be sure that the fire is clean and red and free from fine or unburned coal. Use only enough air to get the metal red-hot. Any dirt which may be carried into the seam is ruinous to good work. Mix a small quantity of powdered borax with water into a stiff paste, and using a piece of flattened tin, about 12 in. long which is bent V shape for its entire length, place the borax paste (flux) into the seam. Then continue heating the iron until it turns from a red to a white heat. The borax during this heating dries out and forms into bubbles. A little later these bubbles fuse and flow down into the seam like a thick colorless paste. Now quickly, using the V-shaped strip of tin, pour a small quantity of spelter (brass) chips right on the joint and watch carefully until it melts and runs into the joint. When this happens, quickly remove the ring from the fire and cool it off in water. If the work has been well done, a smooth, closed joint will result.

Drill 3/16-in. holes in alternate faces of the ring, being sure that they are central. The legs may now be screwed on the ring using 3/16 by ½-in. r.h. stove bolts, with the heads outward. A ¼-in. lock washer placed beneath each nut will give a very firm joint. The forming of the three metal rings

(Continued on Page 393)

Placing Belt on Pulley

Use a belt hook to place the belt on the pulley. Don't do what the boy in the above picture is doing. He will have four badly mashed and broken fingers before his hand is released.

When shifting overhead belts, use a belt hook with a stick reaching nearly to the floor.

Safety Series — Earl L. Bedell and George Peacock, Detroit, Mich.

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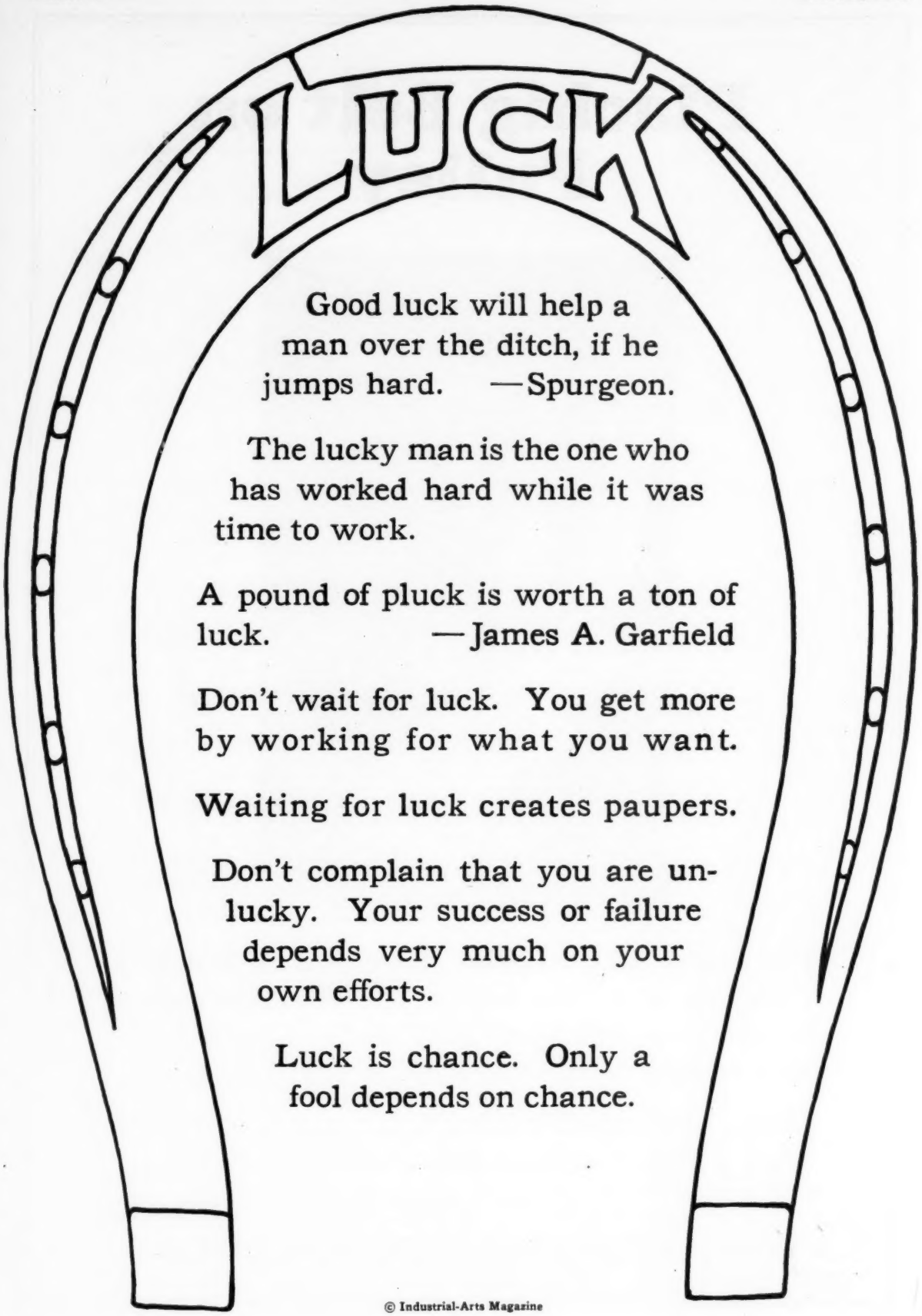
LUCK
Good luck will help a man over the ditch, if he jumps hard. —Spurgeon.
The lucky man is the one who has worked hard while it was time to work.
A pound of pluck is worth a ton of luck. —James A. Garfield
Don't wait for luck. You get more by working for what you want.
Waiting for luck creates paupers.
Don't complain that you are unlucky. Your success or failure depends very much on your own efforts.
Luck is chance. Only a fool depends on chance.

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(Continued from Page 390)

will present little difficulty. The bowl is of glass and may be bought at any fish store. The upper part of the legs should be bent to fit the bowl.

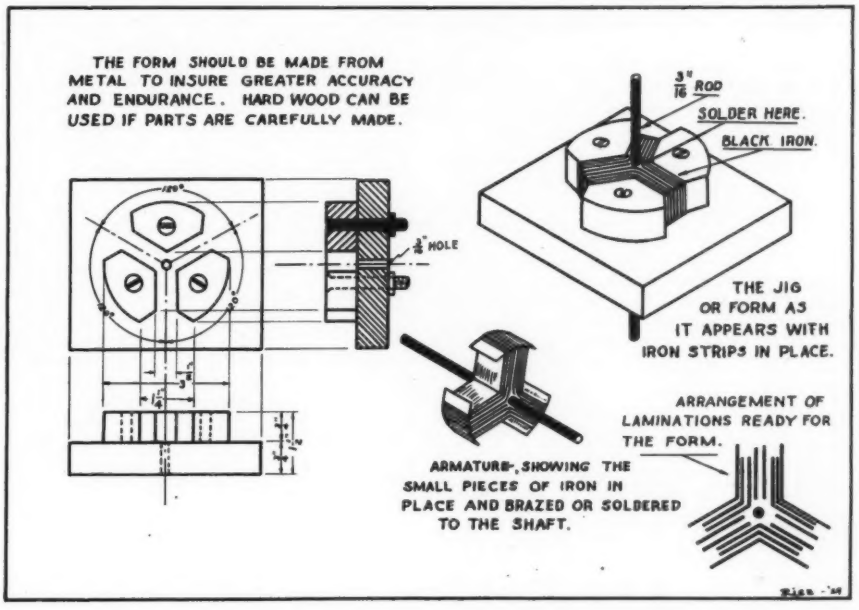
This bowl holder may be made beautiful by an intelligent use of brushing lacquer. First wash the whole stand in hot water into which soap powder had been mixed, then dry it thoroughly, after which a light coat of jesso should be applied. After thirty or forty minutes this may be patted with a flat stick to work up a stippled effect, then the stand should be put away for a day to allow the jesso to harden. Then a coat of gold paint mixed with banana oil should be applied lightly. After half an hour this will be dry enough, so that it may be spotted with carmine, forest-green powder, sun glow, and fire glow. All of these colors are to be just spotted and then patted with a soft cloth which has been formed into a ball. The patting causes the colors to merge. After the colors have dried, a final coat of clear brushing lacquer should be applied.

The material and decoration of the fish-bowl stand, exclusive of the glass bowl, cost about 40 cents. This is a popular project and can be made by a boy in from three to four hours.

A THREE-POLE ARMATURE FOR TOY MOTORS

Charles M. Rice, North Junior High School, Everett, Washington

It is quite difficult to make a three-pole armature for small motors without the aid of special equipment. Few small shops have the facilities for stamping out the laminations, and it is for this reason perhaps, that small motors are usually designed so as to evade the use of armatures having more than two poles.


THE FORM SHOULD BE MADE FROM METAL TO INSURE GREATER ACCURACY AND ENDURANCE. HARD WOOD CAN BE USED IF PARTS ARE CAREFULLY MADE.
3/16" ROD
SOLDER HERE.
BLACK IRON.
THE JIG OR FORM AS IT APPEARS WITH IRON STRIPS IN PLACE.
ARRANGEMENT OF LAMINATIONS READY FOR THE FORM.
ARMATURE, SHOWING THE SMALL PIECES OF IRON IN PLACE AND BRAZED OR SOLDERED TO THE SHAFT.

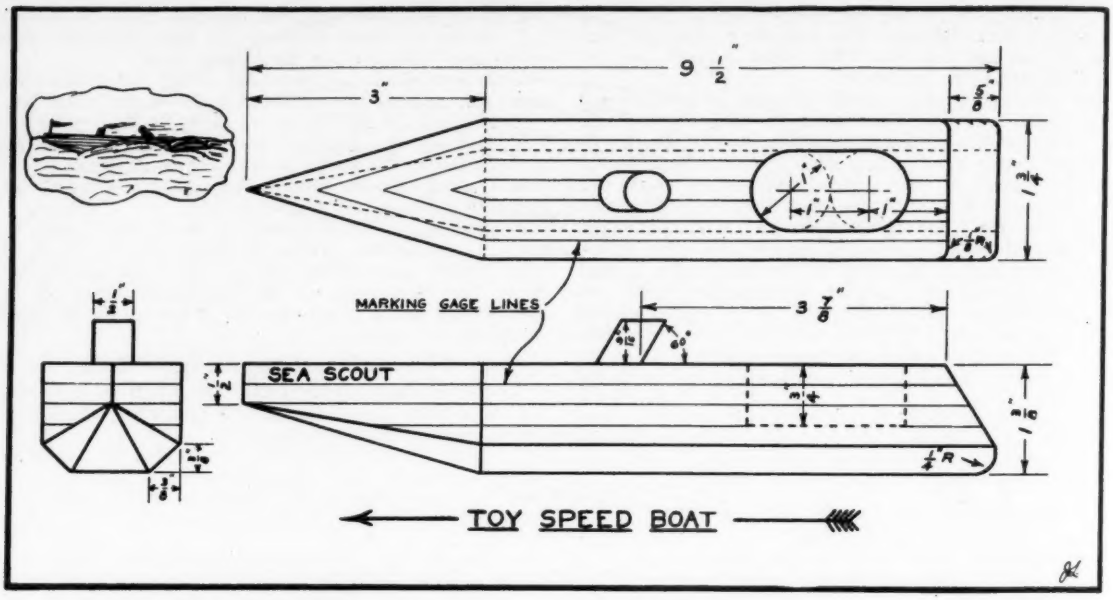
To overcome this, the writer devised a method for making a simple three-pole armature to fit the field of the motors which were being made in his classes. The first thing to do is to make the jig shown in the accompanying illustration. The description which follows shows how the jig may be made of hard wood. For greater accuracy, however, it would be best if it were made of metal.

Construction of the Jig

1. Select two pieces of hard wood finished on both sides.
2. Determine the diameter of the armature to be constructed and draw a circle of this size on one of the pieces. Mark this piece of hard wood No. 1 and the other piece No. 2.
3. Using the same center on pieces No. 1, draw another circle with a radius at least ½ in. larger than the first.
4. Draw the same circle on piece No. 2.
5. Divide the outer circle on the first piece, into three equal parts, and draw the three center lines.
6. Step off ¾-in. on each side of the center lines, and draw lines through these points, parallel to the center lines.
7. Saw out the large circle on piece No. 1.
8. Saw out the segments from the circular piece just made, being careful to leave lines on each segment.
9. Carefully file the edges of the segments until each conforms to the lines which limit its size.
10. Fasten the three segments to block No. 2, using the circle as a guide for correct placement.
11. Drill a hole through piece No. 2 in the center of the circle. The hole should be the same diameter as the rod used for the motor shaft. The jig is now ready to receive the pieces of metal.

Construction of the Armature Core

1. Place a short piece of the rod, which is to be used for the armature shaft, in the hole of the jig, allowing the rod to project on both sides.
2. Place the end of the shaft in a vise, in the vertical position, with the jig resting on top of the jaws.
3. Cut several pieces of black iron into narrow strips having the same width as the thickness of the segments on the jig.
4. Cut six pieces from the strips just made. These pieces should be long enough to extend from the shaft in the center of the jig to the circumference of the circle which limits the diameter of the armature. These pieces form the center laminations for each pole.
5. Six longer pieces are cut and pressed into place outside of the short pieces.
6. Three long pieces much longer than the previous ones, are cut and forced into place at the outside. The ends of these outside laminations are left long enough to bend back after the coils have been wound in place.
7. Solder the edges of the laminations to hold them intact, and join the shaft to the core with solder.
8. When the solder is cool, remove the core from the jig, reverse ends of the shaft, and replace it again. Solder as before, being careful not to use more solder than is necessary.
9. The armature core may now be taken from the mold and trued up with a file. It is important that each pole have nearly the same weight in order that they will balance, so that the motor may function properly. A little solder added to a pole will help to balance the armature. After covering the poles with a layer of insulating cloth or friction tape the coils may be wound in place.



TOY SPEED BOAT

Jos. J. Lukowitz, Milwaukee, Wisconsin

Be conservative. After your planing blocks have served their purpose as a planing exercise, use them for the making of the boat shown in the accompanying illustration. There is enough planing on this boat to develop some skill and facility not only in planing flat surfaces, but also chamfers and tapers. The marking-gauge lines, which represent boards in the construction of the boat, give considerable motivated practice in gauging. The boring of the two holes, and the chiseling required to make the seating space, is easily done by the boys after a little demonstration by the teacher. The exhaust funnel is made of a piece of ½-in. doweling nailed in place. It could also be set into a ½-in. hole. The engine exists, in the boys' imagination, inside the hull. A simple finish for the boat is a liberal oiling with linseed oil.

Much enthusiasm will be aroused if each boy is permitted to select a name for his own boat. This enthusiasm can be turned to a little impromptu spelling lesson by having each boy write his suggestion on the blackboard while the others watch. It is interesting to see how many names are suggested, and don't be surprised if "Rum Runner" is among them. In any event, here is a chance to put over some basic tool processes with plenty of motivation.

WHEELS FOR TOYS

E. A. Rerucha, Wakefield, Michigan

Many shop teachers have perhaps found that their largest problem in connection with the making of toys requiring wheels, was the making of the wheels. By adopting the new type of can opener as a shop tool, although it perhaps rightfully belongs to the housewife, and asking the boys to bring the tin cans the wheel problem is about solved; that is where wheels of a diameter of about 2 to 3½ in. are required. Not only will the wheels be easy to make, but they will have somewhat more of a "classy" appearance if one may describe them by that term They will very closely resemble disk wheels. Tin roofing-paper washers are used for the hub. These can be obtained very cheaply in any hardware store. One disk (end of can) and two washers are required for each wheel.

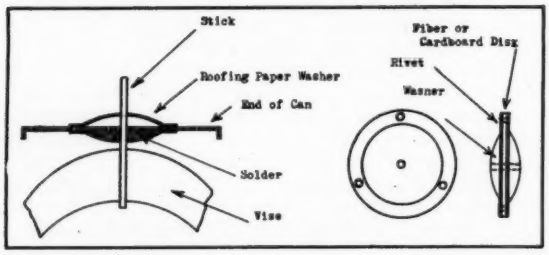


FIG. 1. METHOD OF SOLDERING WASHERS TO DISK

FIG. 2. WHEEL OF ROOFING PAPER WASHERS

Fill the center of the disk and punch a hole through it of the same diameter as the hole in the roofing-paper washer which is already punched. A nail may be used for punching hole. Punch another hole with an 8d nail about ¼ in. off center. This hole is for soldering as described below. With sandpaper, round off a match stick so that it fits snugly in the holes in the washers and disk and assemble and clamp in a vise as shown in Figure I. Cut small pieces of solder, enough to fill in the space between the bottom washer and the disk, and put them in place. Now heat the disk and washer with a soldering copper, sweating the disk to the washer. The stick must fit tightly to keep the solder from running out at the bottom. If more solder is necessary to fill the space, melt it in through the off-center hole. By pressing on the disk while the solder is being heated, it may be kept from overflowing out of the washer. The purpose of the solder between the disk and washer is to provide a greater bearing surface than would be the case if the washer was merely soldered around the edges. Now place the second washer on top and solder along the edges only. Of course, any size hole can be made for the axle by punching it of the desired size in the first place and using a stick to fit the holes, or the hole may be drilled to the desired size after the soldering has been done.

By using the wheel with the rim on the outside a very satisfactory result is obtained. The washers also serve to reenforce the disk, making the wheel more durable.

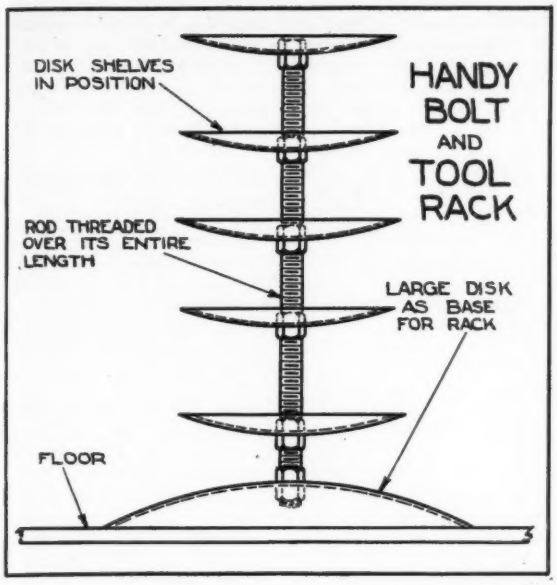
Smaller wheels of a diameter equal to the roofing washers, which is about 1¼ in. may be made by placing a disk of thick fiber or cardboard between two washers and riveting along the edges with small rivets cut from brads, as shown in Figure 2.

HANDY BOLT AND TOOL RACK

L. M. Jordan, Donalsonville, Georgia

Nothing saves more time in the farm workshop than "A place for everything and everything in its place." If an assortment of bolts, rivets, nails, hinges, etc., of various sizes or kinds are heaped together in a container, much time is lost in finding the particular article desired. The handy rack described herewith will obviate this.

From the scrap box, obtain a large farm disk and several smaller ones, a few nuts and a steel rod a few feet long.



Thread the rod over its entire length. Pass the large disk on one end with its concave side away from the center of the rod. Run a nut on the rod on each side of the disk and jam the disk between them on the end of the rod. Then place the other disk in a reversed position at intervals along the rod as shown in the illustration, running a nut against each side of the disks and drawing them tight to hold the disks steady. Set the rod upright with the large disk against the floor. This serves as the base to hold the rack upright, and the smaller disks form handy shelves that will hold small parts in a manner that they can be easily reached when wanted. The inward incline of the convex upper sides of the disks prevent round objects from rolling off the shelves.

The rack is easy to transport by leaning it slightly to one side, thus throwing its weight on one edge of the large disks. Then by rolling the rod in the hands, the rack is propelled much like a barrel which is moved across the floor by rolling it on the edge of its lower hoop.

HOBBY HORSE

C. Anthony Van Kammen, Grand Rapids, Michigan

The Christmas season is approaching and many boys will desire to construct some toy to give to a little brother, cousin, or friend. A very substantial and acceptable gift is the hobby horse offered in this article. The problem was designed at the request of boys in an auxiliary class, but it has found favor among seventh-grade boys as well. Woodworking machinery was used throughout, but no lumber was used that was not hand-planed to remove all mill marks. The stock bill which follows, shows finished sizes. Either bass or gumwood may be used.

Bill of Material

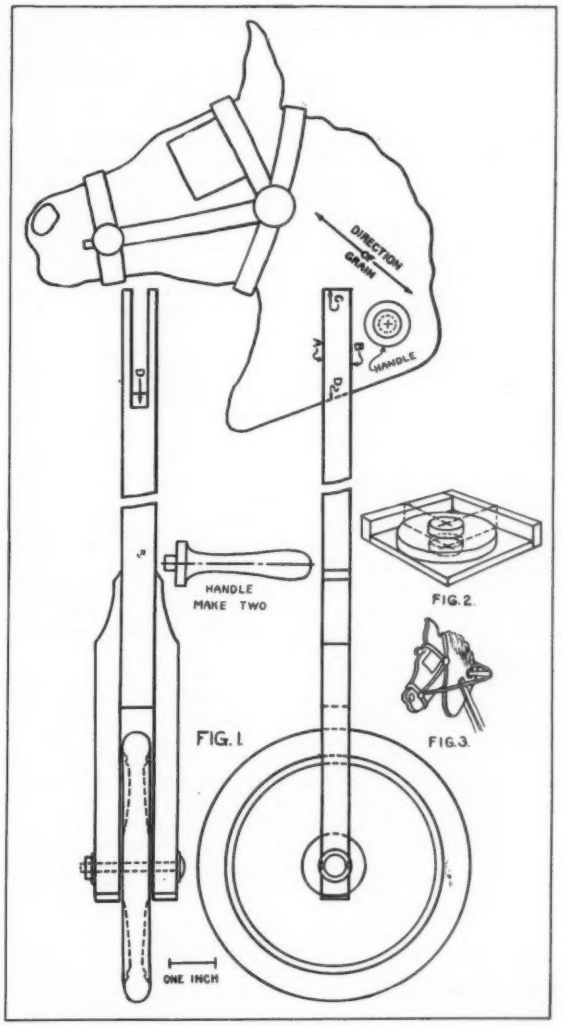
1 pc.	7½	x 9	x	½	Head
1 pc.	6	x 6	x	⅝	Wheel
1 pc.	26	x ¾	x	⅝	Shaft
2 pc.	7	x ⅝	x	½	Saddle
2 pc.	3¼	x 1	x	1	Handles

Hardware

1 3/16 x 2½-in. carriage bolt and nut
4 3/16-in. washers

The horse head may be cut from standard ¾-in. lumber or from three-ply veneer ½ in. thick. The latter is the more satisfactory material, as there is less chance of parts of the head splitting off, and it is much easier to chisel out the gains to receive the shaft. Veneer can be built up by the boys and should be three-ply, using a ¼-in. core and ⅛-in. faces. See that the grain of the two outside pieces runs in the same direction and crosswise of the core-stock grain. Several boys can glue and clamp their work in the same set of hand screws. See that the veneer stock is hot and be sure to place sheets of paper between each boy's work. Every boy should write his name on both sides of one of the outside pieces so that he may recognize his own work when it is removed from the clamps. When dry, hand-plane both sides of the veneer to remove all mill marks.

Mark out the shape of the head from a pattern traced from the boy's drawing, and band-saw to the lines. File and sandpaper smooth. The bottom of the head should be planed straight and square with the faces so that a tee bevel can be used on that edge for laying out the gains to receive the shaft. The gains should not be cut until the shaft is cut to size and hand-planed to remove all mill marks. Lay out and mark with a tee bevel, set at the proper angle, the edge of the gain marked A. Square the line across the bottom or planed edge and continue the line on the other side. Clamp the shaft along the knife line, with the end 2½-in. in and draw a knife line around it. With a square and knife, extend this line around to the other side and complete the outline of the gain on the other side. Clamp the veneer to the bench top and chisel out the gains. Chisel lightly with a wide chisel along the knife lines first and then gradually remove the stock to the core. If properly cut, the center material left will be exactly ¼ in. thick. Next, cut the joint on the end of the shaft to slip into the gains. This is best done by finding the center of the wide side with the marking gauge set at approximately center and gauging from both sides. The exact center will be between the two gauge lines. Set the gauge to cut ⅛ in. on each side of the exact center and lay out the section to be removed. Notice on the drawing that the closed end of the slip joint is at an angle, as shown



at D. The shaft should fit into the gains and fit snuggly when completed.

Prepare the two pieces for the jaws, by hand-planing, to remove all mill marks. Band-saw to shape and file if necessary. Keep the joint edge, to be glued and nailed to the shaft, square and true. Do not sand the pieces until after they are glued to the shaft. The holes for the axle bolt may be bored before or after the jaw pieces are fastened in place. The main thing is to see that they are bored straight, and that they line up. Put the bolt through the pieces if the holes are drilled before the work is glued, and see that the band-sawed ends are even on the shaft. The work is now ready for the wheel.

Faceplate and chuck work are too advanced for the seventh-grade boys, so the work must be done between centers. Band-saw the stock for the wheels in the form of a circle. At the same time cut two 1½-in. circular pieces ¾ in. thick from waste stock. As the wheel stock is too thin to turn alone between centers, these pieces are to serve as pads for the dead and live centers and prevent the points of the centers from coming together and becoming injured. They are glued to each side at the center of the wheel stock with a piece of heavy manila paper between so that the pads can be easily chipped off after the wheel is turned.

A jig should be used in order to properly locate the spurs of the live and dead centers on the pads, so that the wheel stock will not wobble when placed in the lathe. The jig may be constructed from the following stock:

1 pc. 6 x 2⅛ x ½
1 pc. 6½ x 2⅛ x ½
1 pc. 6 x 6 x ¾

Locate the center of the 6-in. square piece. Through the stock at this point, with an expansive bit, bore a 1¾-in. hole. Glue and nail the 6 by 2⅛ by ½-in. piece on one side of the 6-in. square piece so that one edge will be flush with the face, while the ends will be even with the sides. On an adjoining side, flush with the same face, glue and nail the remaining piece. See the perspective sketch, Figure 2.

Place the assembled wheel stock in the jig, with one pad in the 1¾-in. hole and so that the wheel stock will touch the two adjacent sides of the jig. With a small hand screw, clamp the wheel stock in place. Measure and mark off from the inside corner each way on the sides of the jig a distance equal to the radius of the wheel stock or 3 in. With the head of a try-square against the outside of the sides of the jig, square lines through the points so they intersect on the pad. With the try-square, continue the lines on around the sides of the jig to the under side and square the lines so as to intersect on the other pad. With a nail or center punch, accurately drive a small hole into the pads at the intersections of the lines. A ⅛-in. hole bored with a drill or a gimlet bit at these points will, if carefully done, locate the spurs on the pads. A ⅛-in. hole may be drilled straight through at a drill press, thus locating the center of the wheel for the bolt.

Secure the stock in the lathe. Have the lathe turn quite rapidly and feed the lathe tools into the wood very slowly and gently, especially if the lathe centers are of small diameter. Only the ⅜-in. and ¼-in. round-nose scraping tools and the parting tool should be used. Keep all beads and edges sharp as this makes the painting of the wheel much easier. It gives definite edges or lines to work to.

After the wheel is completed, turn the handles. These should have a large flange at the dowel end as shown in Figure 1, as the dowel itself is only ¼ in. long. Place the handles well back in the mane so that when the lines or reins are attached to the ends of the handles the child will get the effect of driving the horse. Before painting, assemble the wheel in the fork to see that it fits properly. A few rough jaws can be made to hold the wheels while they are being lacquered and are drying. It is suggested that all pieces be lacquered, except the head which must be painted in oil colors. Lacquer would dry before the colors for the mane could be properly blended.

A very realistic effect can be had by tacking strips of imitation leather to the head for a harness, and fastening reins from the mouth to the ends of the handles, following it along the handles and over around the back of the neck. As stated before, this gives the youngster quite the effect of driving the hobby horse. See Figure 3. It is quite possible that some boy may be able to get pieces of Angora goat hide or some similar long-haired fur from an old baby cab robe, from which to make a real mane. Glue a tiny piece in front of the ear under the harness and from the back of the ear down the neck. If a mane and harness are attached, the head may be lacquered.

TYPICAL JOB SHEET FOR THE AUTO SHOP

Ray F. Kuns, Cincinnati, Ohio

Disassembling Ford Model T Power Plant

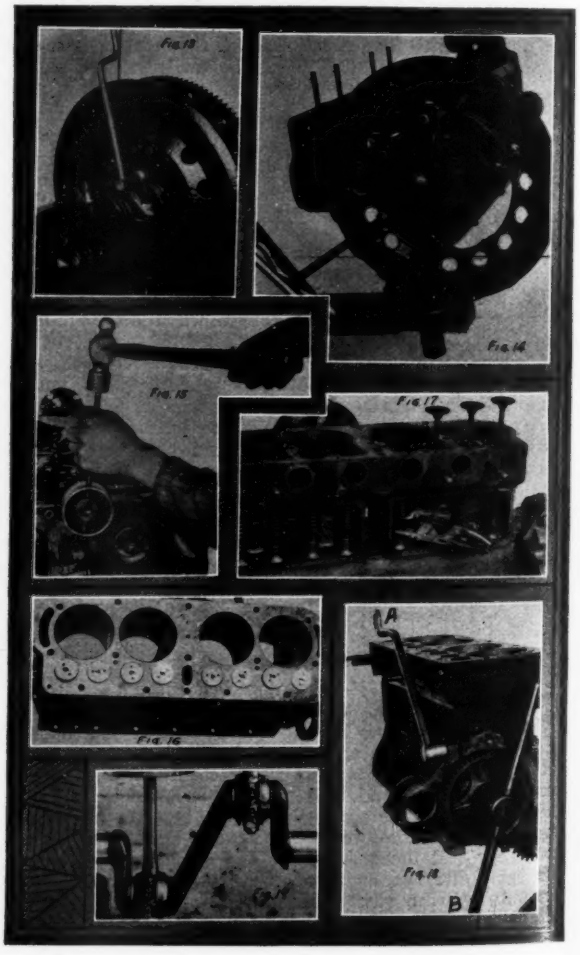
(Continued from Page 350, September, 1929, Issue)

14. The engine may be turned over as illustrated in Figure 13 and a special offset handle wrench used to remove the four engine flywheel cap screws. These four screws are held from loosening by means of a wire, which must be broken and removed before fitting on the wrench. Use care to support the transmission when removing the last screw. Place the transmission on the bench.

15. Figure 14 illustrates the method used in removing the magneto-coil assembly. Four cap screws hold this in position. Note the shims back of this assembly so that the method of reassembling and adjusting the job will be made plain.

16. Use a drift and hammer, as illustrated in Figure 15, to drive out the cranking pin in the end of the crankshaft, which will also allow the removal of the fan-drive pulley. Very frequently this pulley is badly worn and will need to be discarded. It should be checked for "play" at this time.

17. Before removing the valves, it is a good plan to check them for marking. The usual method of marking is illustrated in Figure 16, the valves being numbered from the front, or gear end of the engine, toward the rear in numerals. In case the valves are not so numbered, a center punch may be used to mark them for identification, one punch mark being placed on the first valve, two on the second valve, and so on.



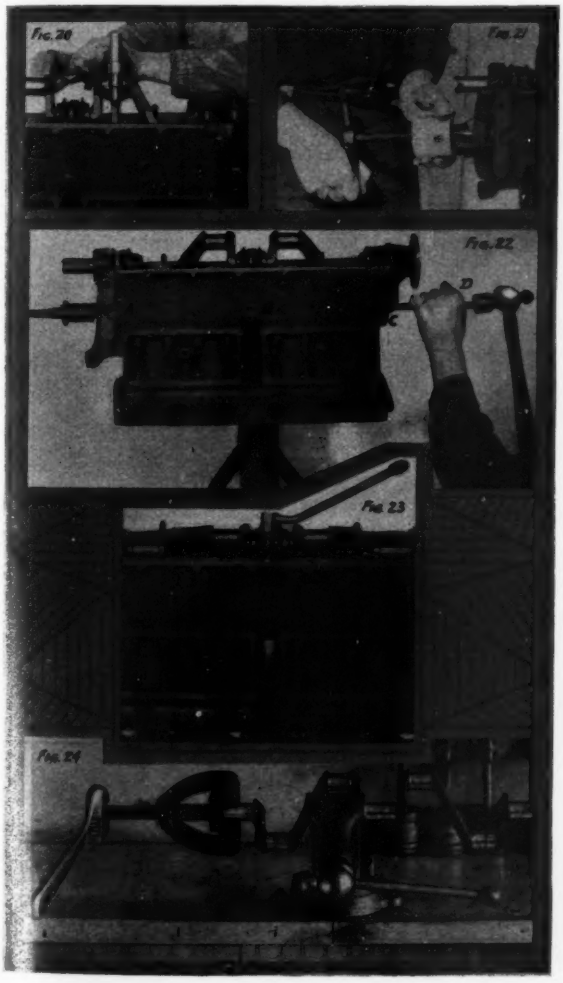
Caution: When marking valves, do not use too heavy a blow, as the valve itself may be damaged thereby. Also see that the valve rests on its seat when being marked and not on the lifter.

18. Use a valve-spring lifter to compress the valve springs. Remove the valve pin, remove the valve lifter and then pull out the valve, as shown for the three valves at the front of the engine in Figure 17. The valve spring may now be removed by hand. Place all valve parts in a proper receptacle.

19. Use a speed wrench to remove the timing-gear cover.

20. Remove the generator-mounting bracket, as shown at A in Figure 18. Also remove cam-gear lock nut with a special wrench, as shown at B in Figure 18.

21. Inspect the connecting rod, big end and cap, to see whether they are marked. These marks should be on the camshaft side. Rod No. 1 should be marked $\frac{1}{1}$, rod No. 2, $\frac{2}{2}$, etc. If they are not marked, use a center punch, Figure 19, and mark them with punch marks—one punch mark being used on the rod and one right below it on the cap, on the camshaft side, for rod No. 1; two punch marks being used for rod No. 2, etc. Some mechanics file notches in the bolt bosses to identify the halves. Remove the cotter pins holding the castellated nuts on the connecting-rod bolts. Use a connecting-rod nut wrench, as shown in Figure 20, to break loose and remove the connecting-rod bolt nuts. When the connecting-rod cap is free it should be lifted off, while holding the connecting-rod bolts up in position to prevent the loss of any shims. While holding the bolts in the rod, push the rod downward and swing to the side of the crank pin. Reassemble the rod cap in its original position and spin on the nuts a short distance. The piston and connecting-rod assembly may then be pulled through the top of the engine, dropping down as shown in Figure 20.



22. The cam gear is assembled on the end of the camshaft with a press fit. Two dowels are used to align it and the camshaft nut, removed in Step 20, is used to hold it. Sometimes these gears are loose, owing to continuous wear. In such cases they may easily be disassembled. In other cases it is necessary to use a puller, similar to that illustrated in Figure 21.

Caution: Under no circumstances use a hard-faced hammer to strike the gear in an attempt to remove it. To do so, will damage the gear teeth beyond repair.

23. The camshaft bearings in the Model T engine are made up of cast iron. They are so designed that they may be removed and installed with the camshaft. Remove the bearing locking screws from points A and B in Figure 22, also the cover from point C. Use a metal drift, as shown at D to drive out the camshaft toward the front of the engine. This will carry the bearings with it. These bearings are split and may be removed from the shaft after they are out of their position in the block.

24. The main-bearing bolts of the Model T Ford run completely through the block and are fitted with a nut for tightening. These bearing bolts also are fitted with square heads. For this reason, special wrenches are required and should be used, as illustrated in Figure 23. Remove the six bearing bolts and nuts. Inspect the bearing caps for markings. Mark if necessary. Lift off the main bearing caps, noting location and number of shims, if any. If shims are found, it is best to preserve them in position by replacing the bolts and caps after the crankshaft has been lifted out. This will save much time when refitting the main bearings.

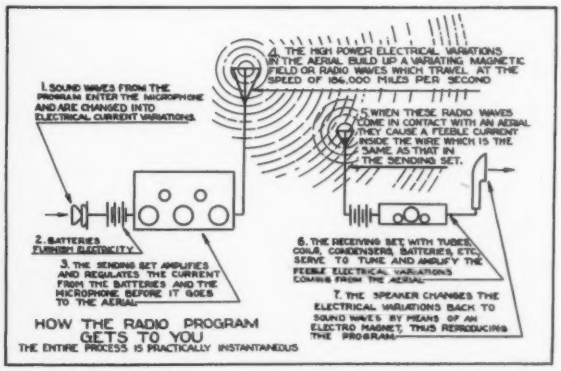
25. If the crankshaft gear is to be removed, as would be the case in a badly worn crank gear, it should be pulled with a special puller as illustrated in Figure 24. In case no puller such as this is available, the arbor press may be used for this operation.

Caution: When doing work on a crankshaft, extreme care must be used not to spring it out of true. For instance, this might happen if the crankshaft were set on end and an arbor press used to press on a new crankshaft gear. Under no circumstances allow the shaft to be placed in such position that it will be thrown about, neither should other engine parts be piled on it, as nicks may be formed in the journals, which would later on ruin the bearings.

INTEREST STIMULATION

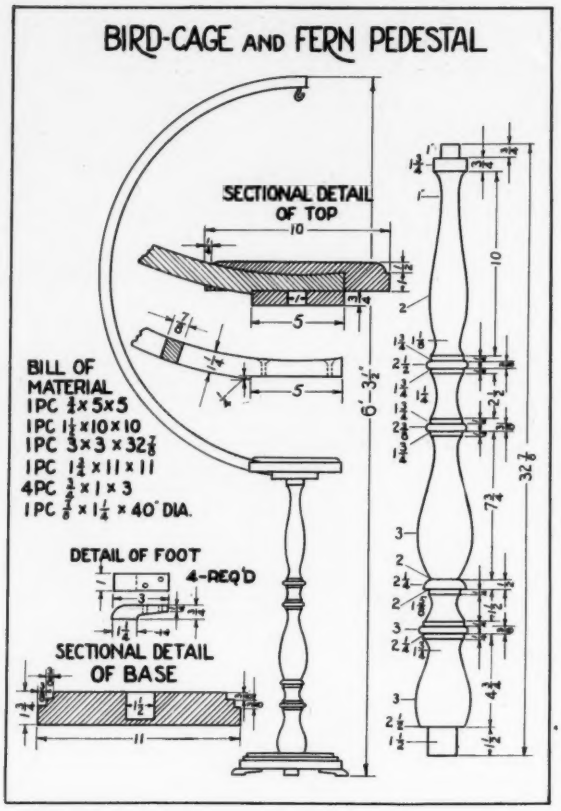
Emory W. Bryan, Arsenal Technical Schools, Indianapolis, Indiana

Interest in a particular subject may be stimulated by making use of an interest already existing in some other subject. For example, radio is at present a very interesting subject to most boys. Many of them would like to know more about it, but do not have the time nor the desire to study the details of the theory very thoroughly. However, by an illustration such as is shown herewith, a general understanding of radio may be had in a minute's time. This type of illustration will teach in a few seconds, about as much material as the average high-school boy could retain after studying the same subject for half an hour out of a book on physics. Besides, the student is given the desired information through the medium of a drawing. He is therefore bound to have a more desirable attitude toward drafting after seeing how it


1. SOUND WAVES FROM THE PROGRAM ENTER THE MICROPHONE AND ARE CHANGED INTO ELECTRICAL CURRENT VARIATIONS.
2. BATTERIES FURNISH ELECTRICITY.
3. THE SENDING SET AMPLIFIES AND REGULATES THE CURRENT FROM THE BATTERIES AND THE MICROPHONE BEFORE IT GOES TO THE AERIAL.
4. THE HIGH POWER ELECTRICAL VARIATIONS IN THE AERIAL BUILD UP A VARIATING MAGNETIC FIELD OR RADIO WAVES WHICH TRAVEL AT THE SPEED OF 186,000 MILES PER SECOND
5. WHEN THESE RADIO WAVES COME IN CONTACT WITH AN AERIAL THEY CAUSE A FEEBLE CURRENT INSIDE THE WIRE WHICH IS THE SAME AS THAT IN THE SENDING SET.
6. THE RECEIVING SET WITH TUBES, COILS, CONDENSERS, BATTERIES, ETC. SERVE TO TUNE AND AMPLIFY THE FEEBLE ELECTRICAL VARIATIONS COMING FROM THE AERIAL.
7. THE SPEAKER CHANGES THE ELECTRICAL VARIATIONS BACK TO SOUND WAVES BY MEANS OF AN ELECTRO MAGNET, THUS REPRODUCING THE PROGRAM.
HOW THE RADIO PROGRAM GETS TO YOU
THE ENTIRE PROCESS IS PRACTICALLY INSTANTANEOUS

was used to help him learn something in which he was interested.

I have used this same method to explain football, aviation, the solar system, and many other interesting things which are of particular interest to the boys. It has given my students a better appreciation of the subject of drafting, and at the same time has broadened their scope of knowledge.



COMBINATION BIRD CAGE AND FERN STAND

C. F. Zaenglein, Circleville High School, Circleville, Ohio

The combination bird cage and fern stand shown herewith has been a popular project in our industrial-arts department. It is mainly a turning problem. The top and bottom is faceplate work, while the main stem is simple spindle turning.

The large semicircular piece may be sawed out, or it may be bent to a 40-in. diameter. It is fastened to the pedestal by means of two stout screws and glue as shown in the illustration. The top is fastened by screws from below through the 5-in. piece.

Any hard wood is suitable for this project. It may be finished with varnish or enamel, or it may be given a polychrome finish. The polychrome finish has been very popular with us, and seems to be in demand in many places.

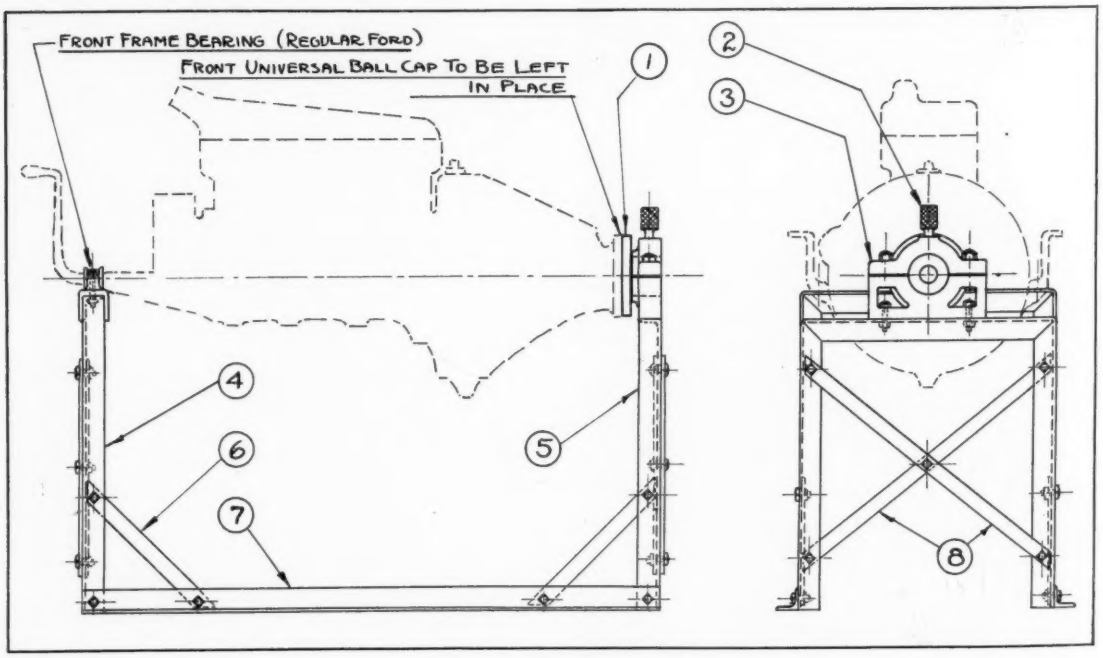
The project was first given a coat of shellac. After this was dry, Persian clay was put on with a twisting motion of the brush. After the clay had dried hard and firm, it was sanded slightly. Gold bronze was then applied all over. This was followed by a coat of Prussian-blue paint which was wiped off carefully before the paint was thoroughly dry. This process brought back the gold as a high light and left the background a dark, rich bluish effect. The beads were not painted.

The ¼-in. bands on each side of the beads were painted with black enamel which helped to make a snappy contrast.

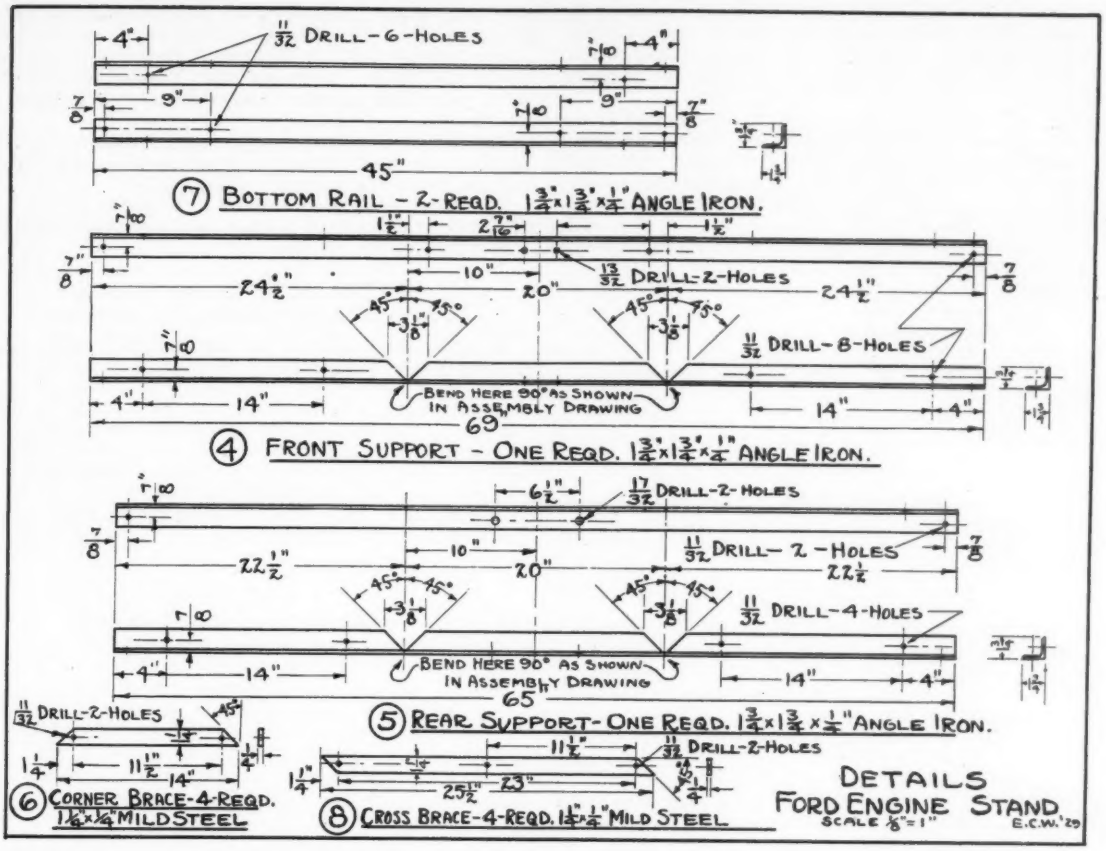
A UNIVERSAL STAND FOR A MODEL T FORD ENGINE

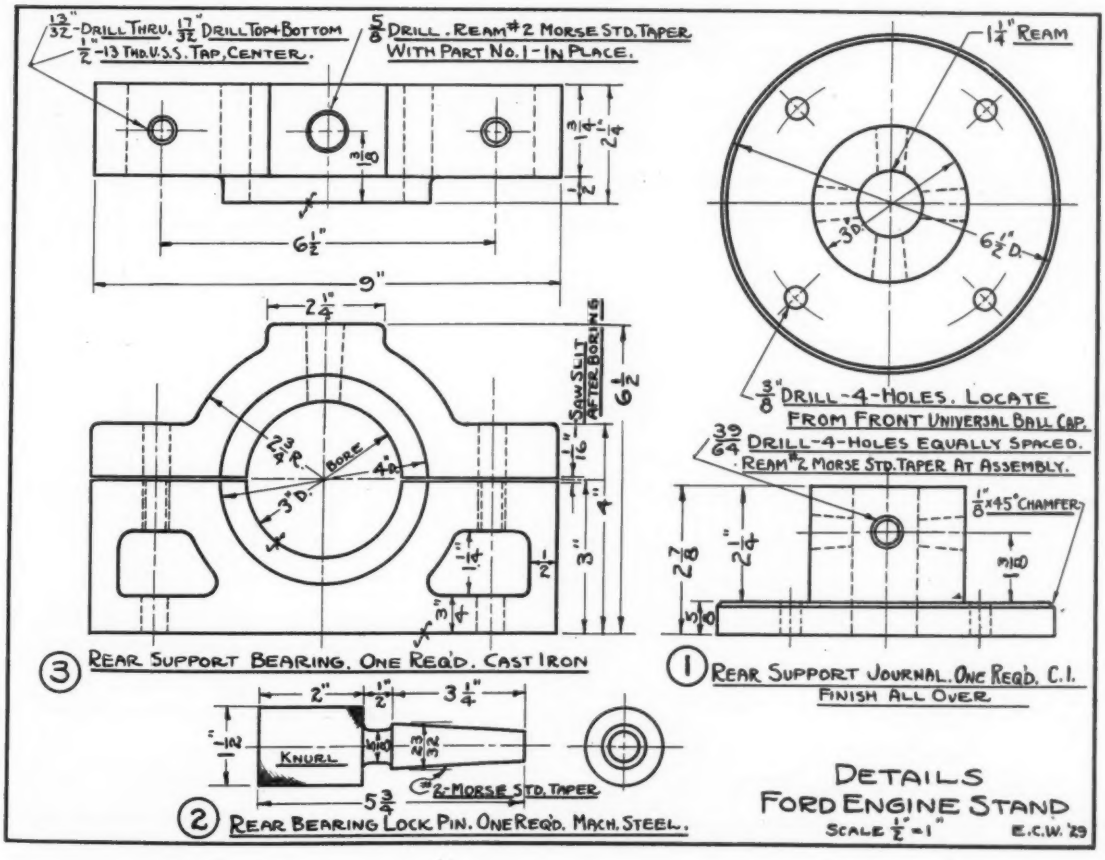
E. C. Wittick, University High School, University of Chicago, Chicago, Illinois

The accompanying illustrations show a unique type of universal, or semiuniversal, Ford engine stand. It was designed, built, and used in our advanced general-shop classes during the last school year. We needed a universal stand to expedite the job of "taking apart," "putting together," and "run-



ASSEMBLY OF FORD ENGINE STAND


11/32 DRILL-6-HOLES
45"
7 BOTTOM RAIL - 2-REQD. 1 3/4" x 1 3/4" x 1/4" ANGLE IRON.
13/32 DRILL-2-HOLES
11/32 DRILL-8-HOLES
BEND HERE 90° AS SHOWN IN ASSEMBLY DRAWING
69"
4 FRONT SUPPORT - ONE REQD. 1 3/4" x 1 3/4" x 1/4" ANGLE IRON.
17/32 DRILL-2-HOLES
11/32 DRILL-2-HOLES
11/32 DRILL-4-HOLES
65"
5 REAR SUPPORT - ONE REQD. 1 3/4" x 1 3/4" x 1/4" ANGLE IRON.
6 CORNER BRACE-4-REQD. 1 1/2" x 1/4" MILD STEEL
8 CROSS BRACE-4-REQD. 1 1/2" x 1/4" MILD STEEL
DETAILS FORD ENGINE STAND
SCALE 1/8" = 1" E.C.W. '29


13/32" DRILL THRU. 17/32" DRILL TOP + BOTTOM
1/2" -13 THD. U.S.S. TAP, CENTER.
5/8" DRILL. REAM #2 MORSE STD. TAPER WITH PART NO. 1 - IN PLACE.
6 1/2"
9"
2 1/4"
SAW SLIT AFTER BORING
2 3/4" R.
BORE
4"
3" D.
3" 4
1 1/4" REAM
6 1/2" D.
3/8" DRILL-4-HOLES. LOCATE FROM FRONT UNIVERSAL BALL CAP.
39/64 DRILL-4-HOLES EQUALLY SPACED. REAM #2 MORSE STD. TAPER AT ASSEMBLY.
1/8" x 45° CHAMFER
2 7/8"
2 1/4"
3 REAR SUPPORT BEARING. ONE REQ'D. CAST IRON
1 REAR SUPPORT JOURNAL. ONE REQ'D. C.I. FINISH ALL OVER.
2"
1"
3 1/4"
KNURL
#2 MORSE STD. TAPER
5 3/4"
2 REAR BEARING LOCK PIN. ONE REQ'D. MACH. STEEL.
DETAILS FORD ENGINE STAND
SCALE 1/2" = 1" E.C.W. '29

ning" model T Ford engines, and this stand, which allows the engine to be locked securely in any of four positions, suited our purposes admirably. It is suggested that the design may, with slight alterations, be used for any make of engine.

The stand, as made by our pupils, was not welded at the corners, and was held together with bolts instead of rivets. The corners may however be welded if desired, and rivets may be used for fastening the braces, but in the six months of hard use that we have given the stand, no signs of weakness have developed.

The following bill of material is given for the convenience of anyone who wishes to build a similar stand:

Castings:
1 Rear-Support Journal.
1 Rear-Support Bearing.

Machine Steel:
1 pc. 6 x 1¾ round, for rear-bearing lock pin.

Angle Iron:
20 ft. of 1¾ x ¼, for frame.

Flat mild steel:
14 ft. 1¼ x ¼, for braces.

Bolts:
22 5/16 x 1 Square-head machine, for fastening frame and braces.
2 ½ x 2 U. S.S. Hex-head cap screws, for rear-support bearing cap.
2 ½ x 1½ S. A. E. bolts to hold rear-support bearing in place.
4 ⅜ x 1½ S. A. E. bolts to fasten to rear-support journal to engine.
2 ⅜ x 2 S. A. E. bolts for front-frame bearing.

No difficulties were encountered by our second-year pupils in making this stand, from the illustrations which accompany this article; hence, in making this stand, the process of construction will not be described here. In the case of the rear-support bearing, the drawing may not be exactly clear as to the method of procedure, so the following explanation is given: The pattern was made so that the bearing and cap were cast in one piece. Then the whole casting was put in a large chuck on the lathe, the hole was bored, and the raised portion around the hole was faced. Next, the bottom was finished by using a large end mill. The bearing was then slit in the milling machine, using a thin saw as indicated on the drawing.

The radiator supports and the storage battery hanger are not shown on the drawings but these may be quickly devised, and are left to the judgment of the builder.

This stand gives more access to the engine and is more solid when the engine is running than any other stand that the writer has seen so far.

PAPER-COLLECTING TRUCK

Harry E. Andersen, Erie, Pennsylvania

Collecting waste paper in each classroom in a modern school building is best accomplished through the use of a large container which can be easily transported from room to room.

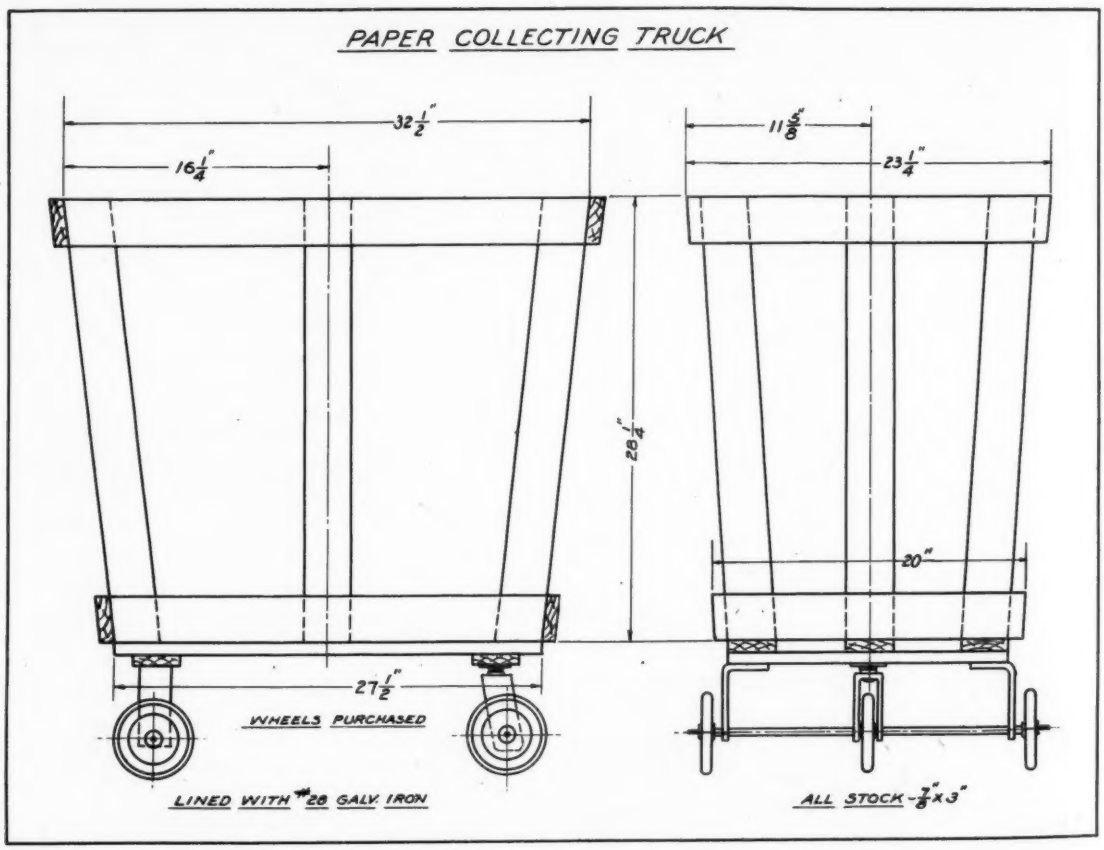
The truck shown in the illustrations was made in the school woodshop, and lined in the sheet-metal department. The wheels were purchased. The rear wheel supports and front fork were made of band iron. The shaft and collar were made of machine steel in the school machine shop.

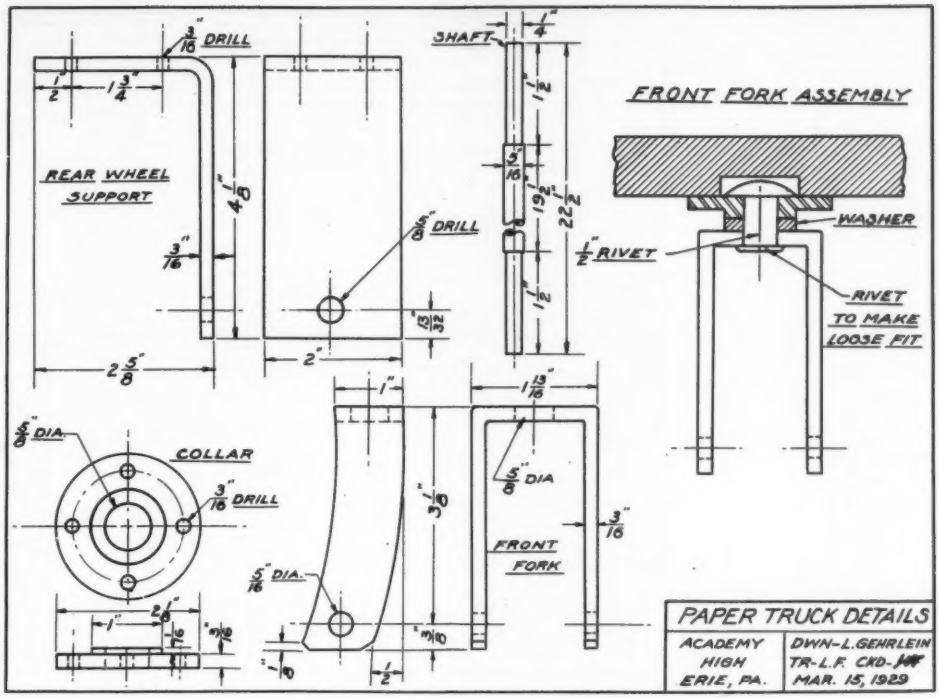
This makes a cheap, noiseless, sturdy truck which lightens the burden of the custodian whose duty it is to gather and dispose of the waste.

A NAIL BOX

Jonathan Bright, Erie, Pennsylvania

One of the things which irritates the woodshop teacher is to see a boy who needs a half dozen nails or screws, go to the stockroom and get a whole handful, spread them out on his bench, use as many as necessary and leave the rest to be swept onto the floor, or perhaps driven into the top of the bench. To correct this, the writer had the sheet-metal trade class make several dozen boxes from bright tin, like the drawing. These boxes were properly labeled, filled with nails or screws and hung in the stockroom. They are then issued only on check.





All checks must, of course, be accounted for before the class is dismissed.

The construction of the boxes is very simple and requires very little explanation. The three patterns are laid out and cut as shown. The edges marked "hem" are then turned over tight. The patterns are bent over at right angles on the broken lines and the allowance left for soldering is also bent at the same time. The three pieces are then soldered together.

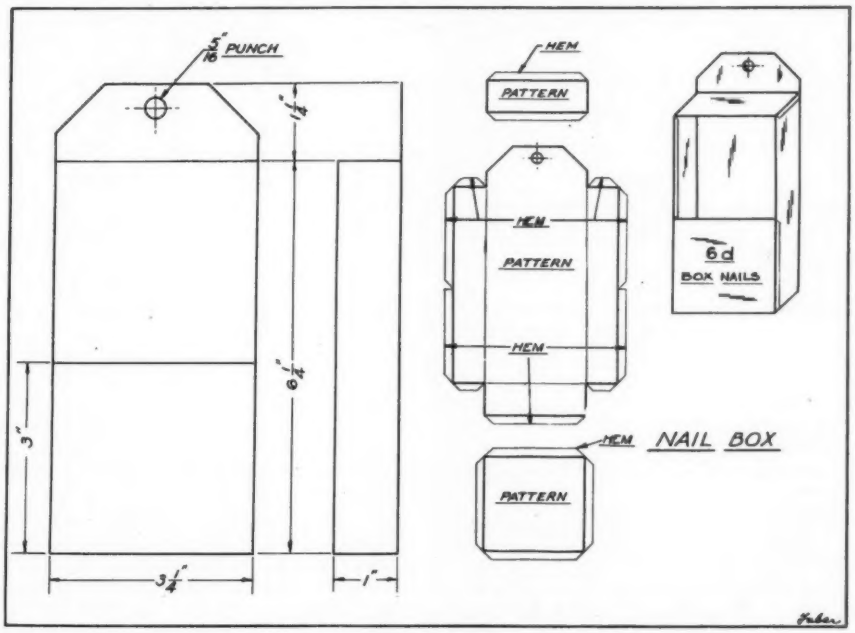
A FOUR-INCH DRILL-PRESS VISE

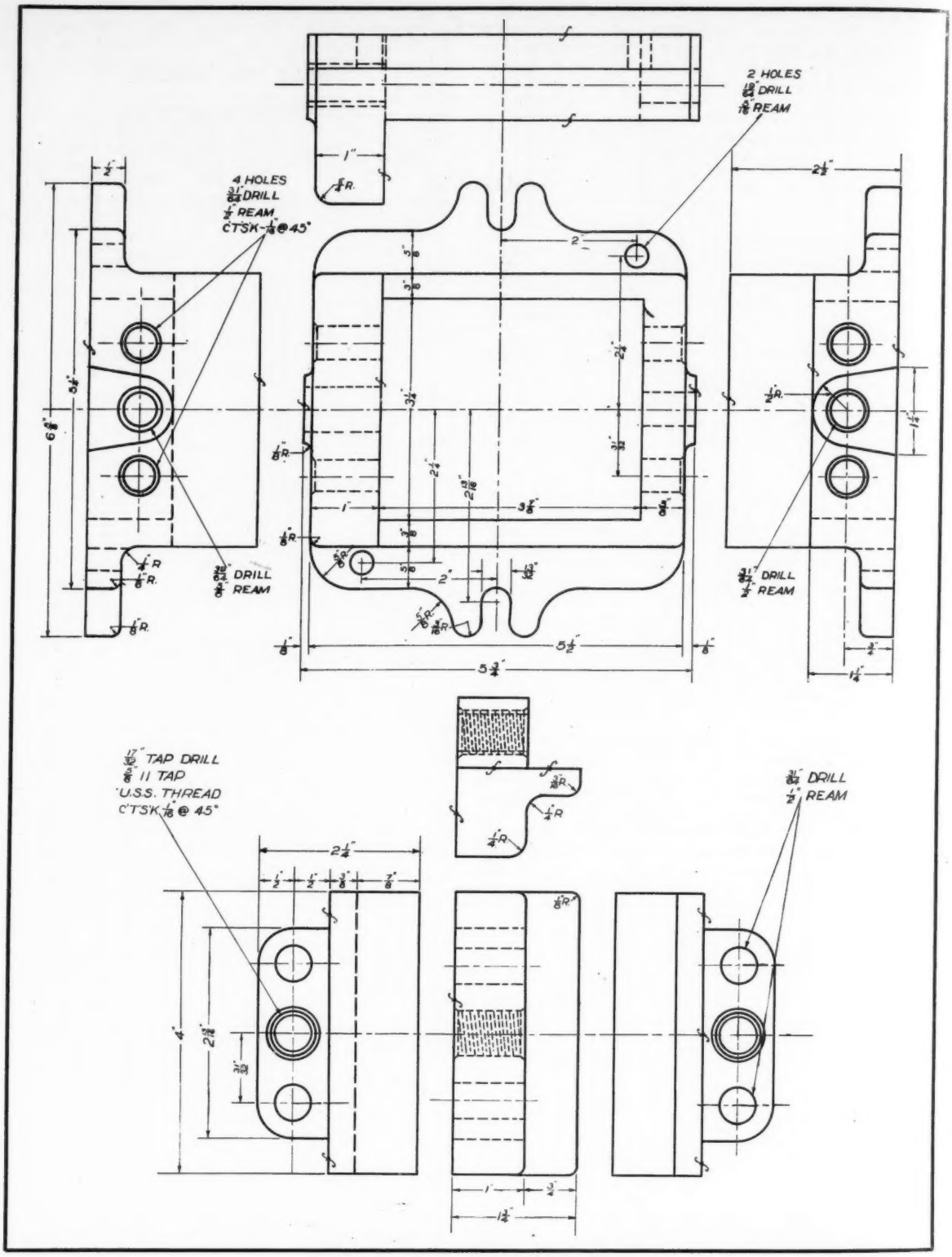
W. P. Childs, South Pasadena, California

The 4-in. drill-press vise illustrated in the accompanying illustrations, has been used as a project for boys in the second year of machine-shop work in the senior high school. This project can be laid out and made without jigs or fixtures and the first ones made in our shop were made that way. On account of the large number of the vises which we have made (more than 100), we have made a special planing fixture and special drill jigs.

If the vise is made without jigs or fixtures, special care should be exercised in laying out, drilling, and tapping the holes for the vise-jaw slides and the vise-jaw screw, otherwise, only ordinary care in machining need be exercised.

Taking up the machining of the various parts of the vise, the base is planed on the bottom side first. For this planing, we take a roughing cut followed by a finishing cut, the two cuts being all that are required. Next, the two locating holes are drilled from a simple locating jig. This jig is located against the vise jaw and the sides of the square opening in the base. The rest of the operations are all made from these two locating holes. The first operation after the two locating holes are drilled, is to place the base casting on a shaper fixture and

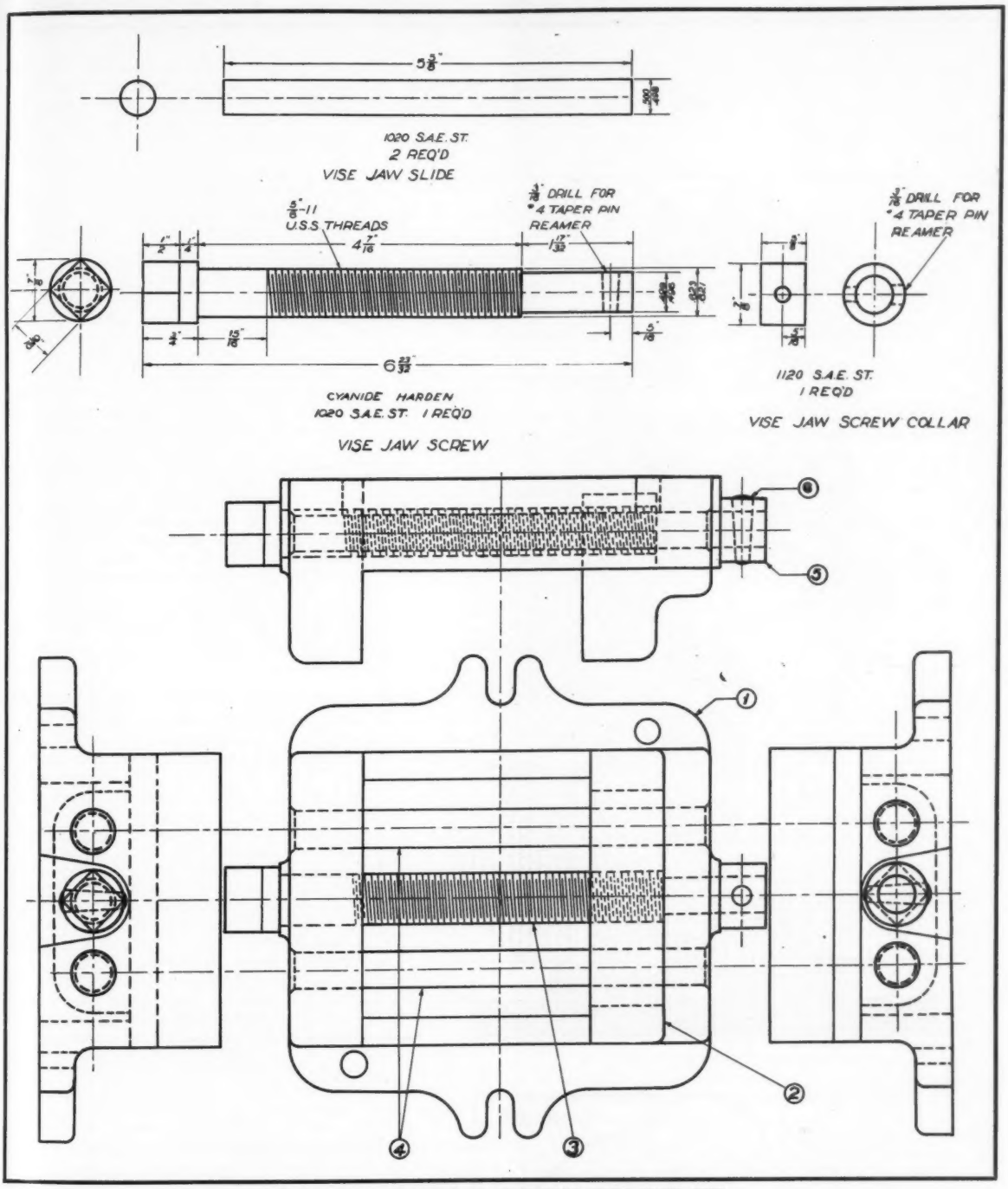




DETAILS OF FOUR-INCH DRILL-PRESS VISE

carefully shape the top face, the stationary jaw, also the two bosses where the vise-jaw screw passes through. Following this operation, the base goes to the drill press where it is fitted on a drill jig by means of the two locating holes, and the six holes in the two ends of the casting are drilled and reamed. The drill jig is fitted with stationary bushings into which slip bushings are fitted to suit the various drilling operations. Three sizes of drills are required; 31/64-in., 39/64-in., and 5/8-in. Two sizes of reamers are required; 1/2-in. and 5/8-in.

The movable jaw is machined by placing it in a swivel vise on the shaper. The first operation is to finish the surface, which fits on the top side of the base, using a roughing and



DETAILS AND ASSEMBLY OF FOUR-INCH DRILL-PRESS VISE

finishing cut. The casting is then turned through 90 deg., and the clamping face of the jaw carefully machined. From the shaper, the piece goes to the drill press where it is placed in a drill jig. Location of the piece is from the clamping face and one end of the part in which the holes are to be drilled. Slip bushings are used in this jig. Three sizes of drills are required; 31/64-in., 17/32-in., and ¾-in. Only one size of reamer is required, a ½-in. The ⅝-in. 11-thread reamer is put in the center hole while the piece is still in the fixture, by removing the slip bushing, placing the tap in the drill press and turning the press by hand. After this operation the jaw is ready for assembly.

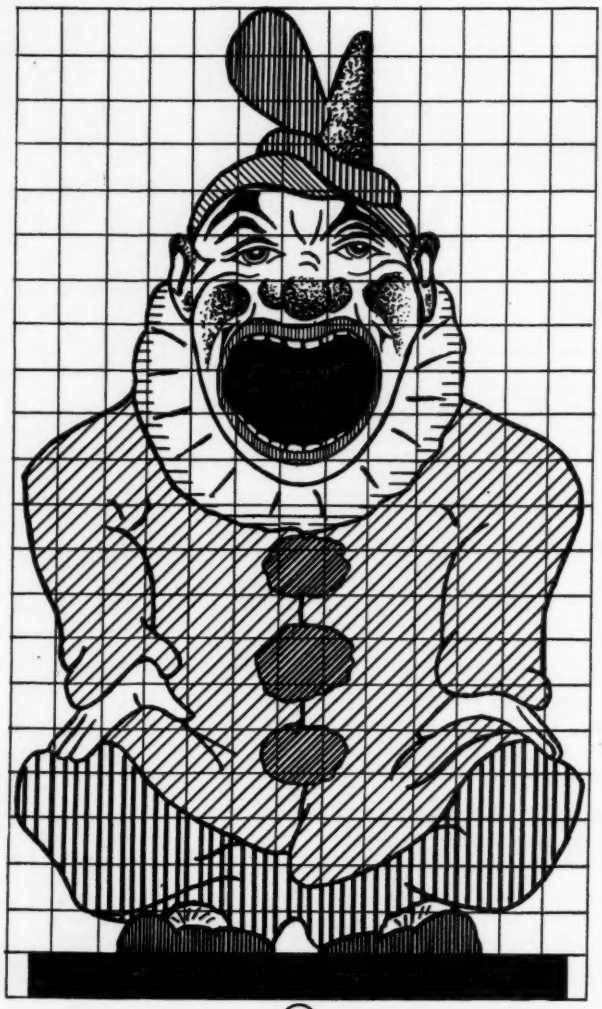
The vise screw is turned on centers in the lathe to the required cylindrical size. After turning, the square is milled on the head end in the milling machine or shaped to size on the shaper. (Some vises have had a ball turned, where the square is shown in the illustration, and a 5/16-in. hole drilled crosswise through it for a 5-in. ball handle.) After the square is machined, the threads are rough chased in the lathe and then sized with a hand die. If the threads are cut direct with a hand die and the lathe is not used, especial care should be used to see that the die cuts the threads in the proper relation to the axis of the screw. The taper-pin hole should be drilled and reamed at assembly.

The vise-jaw slides require no machining except to be cut to the proper length.

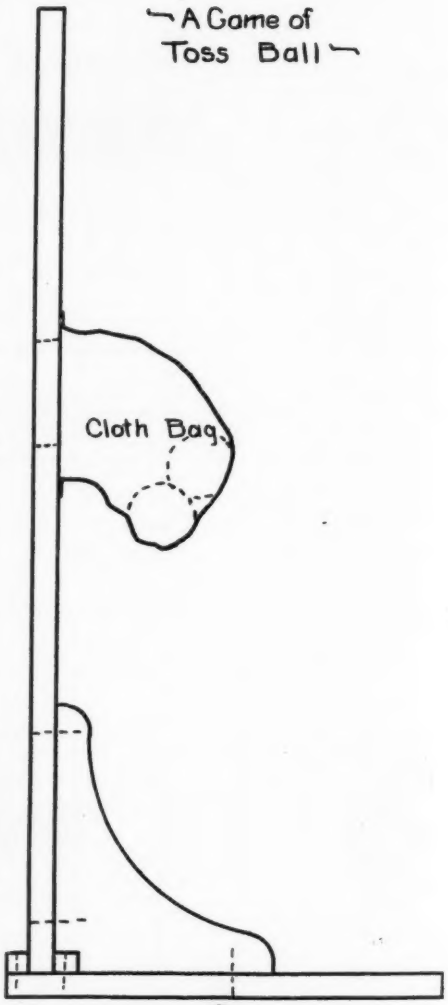
The vise-jaw screw collar is machined from bar stock, held in the lathe chuck. The hole for the taper pin is drilled and reamed at assembly.

After the parts have all been machined they can be quickly assembled. The only machining operation at assembly is that

A SASSY CLOWN



(A)



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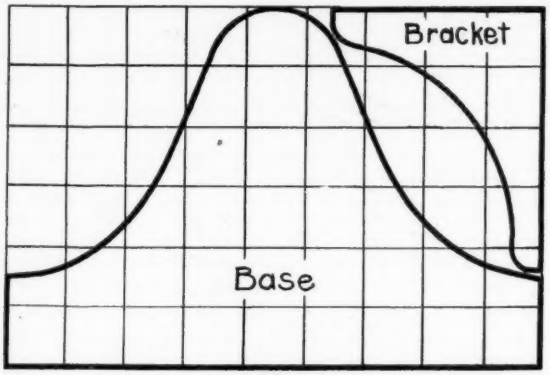


(C)

Material: Wall Board and Light Boards

Size: To be made any size. 16" is average.

M.E. Dodge

of drilling and reaming the hole for the taper pin which holds the vise-jaw screw collar onto the vise-jaw screw.

When the vise has been assembled, the various machined surfaces, except the bottom, should be polished. If the castings have any rough spots, they should be removed, and if there are holes, these should be filled with spot putty before finishing. The parts of the castings not machined should be finished with three coats of black lacquer.

In regard to patterns, they were made of white pine, ⅛ in. being allowed for machining on all finished surfaces.

These vises are not only useful in connection with drill-press work, but are very handy around the home.

A SAUCY CLOWN

M. E. Dodge, Central High School, Charlotte, N. C.

Constructing the Saucy Clown has been a favorite project with a great number of my boys. The building of this game is not too difficult for boys of the upper grades.

The game may be played by any number of players. Each player has a chance to toss each of five marbles into the clown's mouth. The final score is set by agreement of the players and the one who tosses the greatest number of balls or marbles into his mouth wins the game.

Wall board or heavy cardboard is fine material to use in making the clown, although thin wood is even better. Transfer the pattern of the clown to the material by using the squaring method, Figure A. Squares measuring ¾ in., will make the clown 16½ in. tall. This is a good average size.

Use bright colored enamels to paint the clown. Colored crayons or water colors may be used in place of enamel. A coat of varnish applied over the water color will improve the appearance.

Make a base to set the clown on and a bracket, Figure C, to hold him upright. Tack a cloth bag behind his mouth so that he can catch the marbles. Finally, mount the clown on the base.

ANNOUNCES STANDARDIZATION PROGRAM

The National Simplified Saw Specifications Committee of Fitchburg, Mass., has announced the completion of a standardization program which has been carried out by the saw industry under the auspices of the U. S. Department of Commerce. The saw companies concerned in the simplification program were: the E. C. Atkins Company; Henry Disston & Sons, Inc.; R. Hoe & Company; Huther Bros. Saw Mfg. Co., Inc., and Simonds Saw and Steel Company.

Under the simplified program, it is planned to limit manufacturers' stocks of finished saws to those standard types which are in general demand in approximately 90 per cent of the trade. The purpose is to maintain stocks of finished saws which will take care of the customers' standard requirements promptly. Formerly, when an unlimited variety of saws were carried in stock, it became almost impossible to have stocks capable of servicing customers, except at the expense of excessive investments.

The present program is in line with similar simplification programs which have been carried out in more than 90 different industries and which have worked to the benefit of manufacturer, distributor, and consumer, by reducing the amount of capital tied up in slow-moving stocks, by eliminating mistakes in the handling of orders, and by making possible quicker deliveries and better service to the consumer.

FUTURE OF PART-TIME EDUCATION

Mrs. Anna L. Burdick, of Washington, D. C., who spoke before the department of vocational education of the National Education Association in Atlanta, Georgia, discussed "The Future of Part-Time Education." Mrs. Burdick showed that rapid transportation, the automobile, the interurban railway, and the bus has widened the area of employment. Decentralization of industry and specialization has taken production plants nearer to a reserve of labor so that there is a border land of town and country with the population alternating as rural and urban. In the home, commercially prepared foods, ready-to-wear clothes, and specialized service have minimized the drudgery of the household and released the homemaker for other activities. Lines of cleavage which were once hard and fast, and which classified both work and worker, have now been eliminated. Girls and women in every type of work have gone out of the home into the field, factory, office, and store, and these will not and cannot be returned to the home.

Mrs. Burdick points to two recent movements which have aimed at reaching youth at the critical period between the ages of 14 and 16. Both aim to conserve and develop the greatest power of the individual and his fullest contribution to society for his adult years. These two measures are the junior high school and the part-time school.

The part-time school is at the crossroads where the paths to learning and earning divide, and where the youth shifts from the simple life of school activities to the complex and baffling adjustments upon entrance in the industry. To meet the needs of large numbers of children who leave school to go to work, the school extends its responsibilities to those who need a program of instruction and social adjustment. In this work the cooperation of the parent, the employer, the young worker, the school, and the other social agencies are needed. Every effort should be made to enlist the interest and support of the public-spirited employer and to utilize every assistance he offers. In other words, the educational program must be related to the work in the store, the office, the shop, the factory, and the home.

An imminent problem vital to the program is that of recruiting teachers with a vocational point of view and training for a new type of service. If the objectives of the continuation school are to be realized, it is necessary that the teacher shall possess high qualities of character and temperament, sympathy with the desires and experiences of youth, and the power to explain the interplay of knowledge and life simply and patiently, so as to arouse an interest that will bear fruit.

Some of the advantages which are reported and which argue for the future continuance and success of part-time education are as follows:

1. It helps boys and girls to carry over, interpret, and apply in their employment environment what they have learned in the regular day school.
2. It helps young workers to adjust themselves to industrial and business life.
3. It establishes the fact that education does not end when work begins, and it aims to fix the habit of carrying on study coincident with work and to open up avenues to further instruction in evening schools.
4. It develops habits of self-directed and self-controlled effort.
5. It interprets the fundamental principles of economic and industrial organization so as to enable the learner to reason soundly on the problems that confront the worker.
6. It increases the technical efficiency of young workers, as it provides practical instruction related to employment, either in manipulative processes, materials handled, or in methods peculiar to the employment.
7. It involves vocational guidance, selection, training, placement, and follow-up, as essential elements of a program of part-time education.

HOLD FOURTEENTH SUMMER COURSE AT OCEAN CITY, NEW JERSEY

The fourteenth summer course in printing was held on August 3, at Ocean City, N. J., and was under the direction of Mr. Frank K. Phillips, manager of the education department of the American Type Founders Company of Jersey City.

The faculty included Mr. Frank K. Phillips, who taught practices and principles of printing; Mr. George E. Huckins, who taught methods; and Misses Grace and Alice Engels, who taught bookbinding and linoleum-block printing. Students in the course were enrolled from all parts of the country, from Cape Cod to California, with one student enrolled from the latter state. A number of students of this year's classes were enrolled for the terms beginning July, 1930, and it is antici-

THE "METHODS" CLASS, SUMMER COURSE IN PRINTING, OCEAN CITY, N. J.

pated that the 1930 enrollment will exceed the class limit of fifty students.

The accompanying photograph shows a group of the "methods" class preparatory to boarding a bus for the annual visit to Jersey City to visit the foundry and general offices of the American Type Founders Company. The class was entertained at luncheon in the dining room of the company's plant, and returned to Ocean City in the evening.

NOW, ARE THERE ANY QUESTIONS?

Applied Art

886. Q.: I am a student at high school, and taking up a course on "applied art" with hopes of making it my career after graduation. Can you tell me what line you think has the best future outlook?—*M. D.*

A.: It is rather difficult to answer your letter because the term "applied art" is very general. Art is, or should be, applied to every undertaking which we could enumerate. Now that women are entering almost all of the trades and professions formerly occupied by men, there are quite a number that you might choose in which applied art would play a leading part.

Take, for instance, the design of lighting fixtures, interior decorating (by this is not meant merely painting or papering rooms, but the design of interiors for theaters, large residences, etc.), costume designing, jewelry designing, illustrating for newspapers and magazines, commercial-art work, and many more that are not included in this list.

The outlook in any of these various ways of earning a livelihood, is good, especially in the large cities. There is, of course, less opportunity in the smaller cities. Illustrators for the newspapers are always busy. They have to be able to do good work rapidly, of course. Commercial artists are also much in demand but there are quite a great number of them in existence. Hence, some of them have to scramble quite lively in order to make a living. In art, as in everything else, the prizes go to the one who is able to furnish work of superior merit.

Your teachers probably can best give you some idea of what to expect in the local field. They may probably get you in touch with someone in your home town, who can give you definite, first-hand information about conditions in and about your home locality.

Clock Cases

888. Q.: Can you give me information as to where I can obtain material for clock cases?—*W. E. S.*

A.: Probably the best information on clocks of any kind can be obtained from The American Chime Clock Co., 1677-B Ruffner St., Philadelphia, Pa.

Lamp-Shade Frames

889. Q.: Can you give us an address where to get the necessary tools, materials, etc., for lamp-shade frames and finishing coverings?—*M. S.*

A.: For the necessary tools, materials, etc., for lamp-shade frames and finishing coverings, we suggest that you write to the National Art Supply Company, 719 Vandalia St., St. Paul, Minn.; the Metal Crafts Supply Company of Providence, R. I.; and Lewis & Company, P.O. Box 112, Watervliet, N. Y.

Phonograph Parts

890. Q.: Can you give me a list of firms who are in a position to furnish me with phonograph parts and supplies?—*S. L. S.*

A.: *Supplies:* Federal Supply Co., 410 West 28th St., Indianapolis, Ind.; American Phonograph Parts Co., 501 W. 35th St., Chicago, Ill.; Choraleon Phonograph Co., 204 Monger Bldg., Elkhart, Ind.; and Indiana Phonograph Supply Co., 310 Baldwin Blk., Indianapolis, Ind.

Motors: Otto Heineman Phonograph Supply Co., 25 West 45th St., New York, N. Y.

Wrought-Iron Work

891. Q.: Can you give me the names of several books on wrought-iron work suitable to be used as projects in junior-high-school manual training?—*D. C. M.*

A.: "Elementary Craftwork in Metal," by Shirley. Bruce Publishing Co., Milwaukee, Wis.

"Art Metal Work," by A. F. Payne. Manual Arts Press, Peoria, Ill.

"Blacksmithing for School and Shop," by Selvidge and Allton. Manual Arts Press, Peoria, Ill.

"Forge Note Book," by Coleman. Bruce Publishing Co., Milwaukee, Wis.

"Essentials of Metalworking," by Berg and Wing. Manual Arts Press, Peoria, Ill.

"Notes for Forge Shop Practice," by Littlefield. Bruce Publishing Co., Milwaukee, Wis.

"Forging and Smithing," by Jones. The Century Company, New York, N. Y.

Spray-Painting Equipment

892. Q.: We have recently purchased two spraying machines for use in our school shop and find the information sent with them to be rather limited and incomplete for a beginner. Is there a book published on the use, care, and repair of air guns and one that a teacher could use for high-school student instruction?—*H. G. B.*

A.: We do not know, of course, what kind of spraying machine you have, but the Paasche Airbrush Company, 1922 Diversey Parkway, Chicago, and the DeVilbiss Company, 268 Phillips Avenue, Toledo, Ohio, will be glad to give you information about the use, care, and repair of air brushes. Both of these firms have research departments, which they place at the disposal of their customers. They also sell books which relate to spray painting, equipment, and its uses.

Rake Knitting

893. Q.: Where can I obtain materials for rake knitting?—*M. S.*

A.: The J. L. Hammett Company, Cambridge, Mass., will be able to supply you with all of the material required for rake knitting.

Instructors in Electrical and Automobile Shops

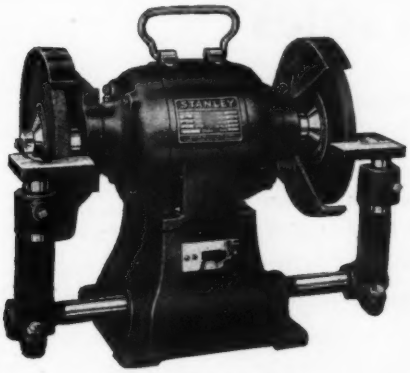
Efficient and Versatile Shop Equipment

THE combination of a Stanley Portable Electric Drill and Drill Stand makes an exceptionally efficient and economical piece of shop equipment for all kinds of bench drilling for either metal or wood. Or, if you wish, the drill can be easily removed from the stand for use as a portable drill.

The smooth operation, reserve power and scientific ventilation of Stanley Electric Drills and Grinders make them particularly adaptable for use in the school shop.

Stanley ¾" Heavy Duty Electric Drill No. 342 in Drill Stand No. 533.

In the new "School Index of Stanley Tools" you will find many helpful suggestions for shop equipment. We shall be pleased to send you a copy with our latest edition of Catalog No. 34.



Stanley Portable Electric Bench Grinder No. 556 specify **A. C.** or D. C.

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NEW PUBLICATIONS

Some Notes on Bookbinding

By Douglas Cockerel. Boards, 116 pages. Price, $2.25. Oxford Press, New York, N. Y.

This statement on the basic materials and processes of bookbinding will delight any lover of beautiful books. It is not a textbook for persons who desire to learn the craft and trade, but an informal, happily phrased, well-rounded description that only a master like Cockerel could write. American teachers of bookbinding and of printing will find the book gives them what the Germans call "Ueberblick" (over-glance) of the subject that is most useful for appraising present-day trade practices. The illustrations, the format, and the binding of the book are quite in keeping with the subject matter.

The Slide Rule

By Ernst R. Breslich and Charles A. Stone. Paper, 35 pages, 6 by 9, illustrated. Price, 50 cents. Published by The University of Chicago Press, Chicago, Ill.

This little pamphlet is designed to make the slide rule popular in secondary-school education. While the instructional material contained in this little booklet has been simplified to quite an extent, yet much of the explanatory matter contained could be still further reduced in order to achieve still greater simplicity.

Blue-print Reading for the Building Trades

By J. Ralph Dalzell, James McKinney, and Herman Ritow. Cloth, 108 pages, 5½ by 8¼, illustrated. Price, $1.25. Published by The American Technical Society, Chicago, Ill.

This little volume shows in a detailed way, how the workers of the building trades may obtain the information which they require, from the blue prints which are furnished them.

The General Shop

By Louis V. Newkirk and George D. Stoddard. Cloth, 190 pages, 5¼ by 7⅝, illustrated. Published by The Manual Arts Press, Peoria, Ill.

The authors have succeeded in giving a very detailed and thorough account of the general shop in this book. The subject matter is well arranged and covers organization, content, teaching devices, management, equipment, and arrangement, in a very thorough way. The chapters on tests and measurements in the general shop and the construction of the curriculum are especially helpful. It is a book which should find wide application in the junior high school.

School Clubs

By Harry C. McKown. Cloth, 498 pages, 5¼ by 7¾, illustrated. Published by The Macmillan Company, New York, N. Y.

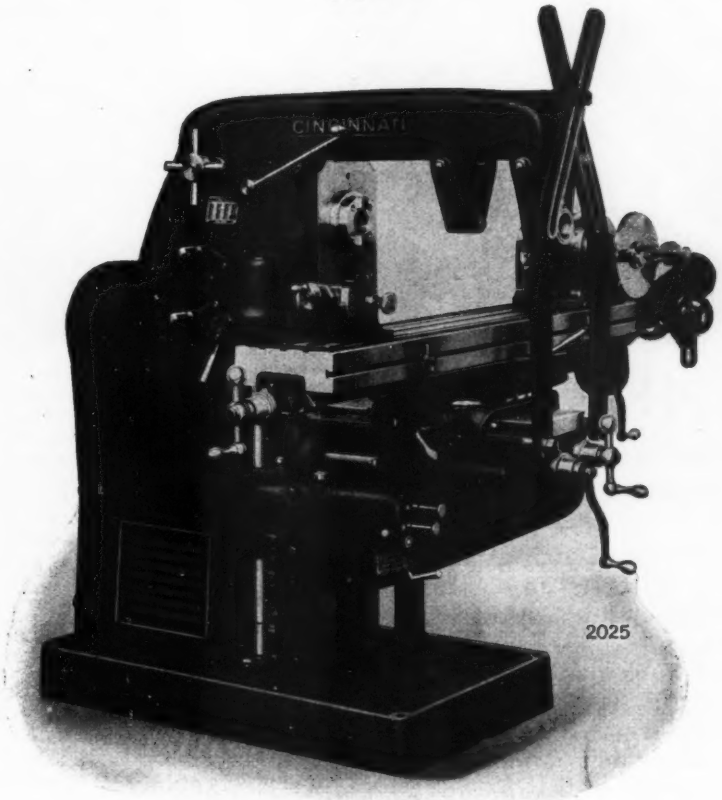
This book will be of considerable help to the instructor who is either interested in or entrusted with extracurricular activities. It describes very ably the objectives of school clubs and the basic principles of club organizations, the administration of the club program and the internal organization of the club. A number of different clubs are explained in detail, among them being several arts and crafts clubs and a number of industrial-arts clubs.

The Objective or New-Type Examination

By G. M. Ruch. Cloth, 478 pages, 5¼ by 7½, illustrated. Price, $2.20. Published by Scott, Foresman & Company, Chicago, Ill.

This book contains a great deal of valuable information for the teacher who is interested in the new-type examination. Numerous examples of different types of questions are given, and the statistical treatment and interpretation of objective tests is made technical enough to interest the person who wants to know something about the mathematical side

(Continued on Page 30a)



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Cincinnati Millers, particularly the M-Type, have been standard in *progressive* schools and colleges. The wide installation of this Miller in the school shops has proved it to be a milling machine most adaptable for instructional purposes and one that will meet with the requirements of your school shop. It is accepted as a standard and generally used in industry; its installation will furnish your student with the type of Milling machine he is most likely to operate in the industrial plant. This Miller is a highly developed machine with all the latest features in design incorporated.

Consider the advantageous *features* of this Miller; safety, accessibility, and ease of control and operation. In addition you know that accuracy is one of the prime factors in toolroom work and the rapidly developing aviation industry. This exceptional accuracy combined with durability makes this Cincinnati Miller the most economical and safe Miller for your school shops. You'll want the best there is. Our illustrated booklet "Facts on Features" will give you the story.

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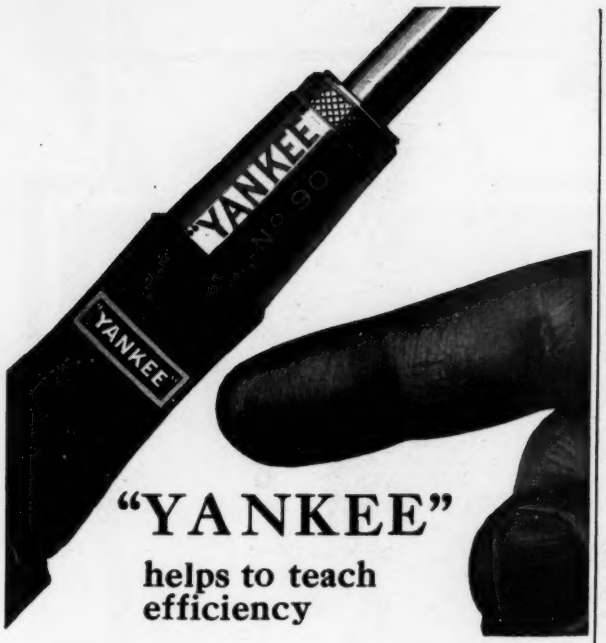

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"Yankee" experts test every blade twice; test every "Yankee" Screw-driver individually before it is sent out from the factory.

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"YANKEE" TOOLS

MAKE BETTER MECHANICS

(Continued from Page 28a)

of the testing problem. A very complete bibliography is appended.

Vocations

By Wm. M. Proctor. Cloth, 382 pages, 5 by 7⅜, illustrated. Price, $1.48. Published by Houghton Mifflin Company, Cambridge, Mass.

Information about the vocations is continually sought for by the teachers of junior and senior high schools and part-time vocational schools. The present volume covers in a general way practically all of the activities which our complex civilization places before the boy in making his choice of a suitable means of gaining a livelihood. Not only the semi-skilled occupations are touched upon, but the requirements for the professions also are discussed. A fairly thorough bibliography is appended.

Efficiency in Vocational Education

By J. C. Wright and Charles R. Allen. Cloth, 443 pages, 5⅜ by 8. Price, $3. Published by John Wiley & Sons, New York City.

The authors of this book, who need no introduction to those who are interested in vocational education, have succeeded in clarifying in this volume the method of taking surveys to show the efficiencies which obtains in any given city. The list of evaluating factors is in itself of sufficient interest to those who are engaged in vocational education, to make the book valuable. The method of weighing these factors and employing them for survey work is well given. This book is a splendid exposition of what analysis can do in definitely outlining a method for solving a given problem.

Books from MS. to Bookseller

By John L. Young. Cloth, 130 pages. Isaac Pitman & Sons, New York City.

The present book belongs to a series of simple manuals on "common commodities and industries" and is written with British practice as the basis. The teacher of printing will find many items of interest because they either reflect the historic basis for present-day practice, or variations in English and American views on craftsmanship, office practice, etc.

New Series of Shop Tests at Lancaster, Pa.

Mr. D. H. Zorger, instructor in shopwork at Lancaster, Pa., has recently completed a series of shop tests in sheet-metal work, electricity, and woodworking, for use in the seventh and eighth grades. The tests are simple, easily understood, and are fully illustrated.

You Can Make It

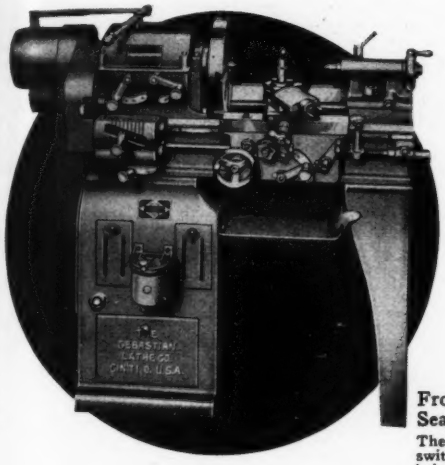
The National Committee on Wood Utilization of Washington, D. C., has made a study of the profitable and economical utilization of second-hand wooden boxes and crates. As a partial solution of this problem, the committee has worked out more than 1,200 plans for using the material to make amusement devices, and useful articles for the home, the garden, and the camp. The plans have been collected in the form of a booklet entitled "You Can Make It," which is being issued by the Superintendent of Documents of the Government Printing Office, at the price of 10 cents per copy, or $4 per hundred.

An Analysis of Investment Banking for Vocational Guidance

Paper, 62 pages. Issued by the Investment Bankers' Association of America, Chicago, Ill. This booklet has been prepared as a guide for colleges and educational institutions in counseling young men who are about to select a vocation. It is believed that the field of finance offers an opportunity to young men in selecting vocations. In the past it was passed by as a vocational opportunity because it was unknown and unrecognized as such.

A Catalog of Small Small Sculptures in White Soap

Fifth annual competition. Paper, 117 pages. An exhibit of last year's entries was held at the Anderson Galleries, New York City.



The 11-inch Gold Seal Heavy Duty Lathe was built to fill the need for a small, high speed lathe capable of production work and at the same time incorporating all the features necessary for extremely close precision work.

a safe lathe! The SEBASTIAN Gold Seal

From the standpoint of personal safety for the operator, the 11-inch Gold Seal heavy duty lathe is unsurpassed.

The motor is built in the leg beneath the headstock and is controlled through a convenient switch within easy reach of the operator. There are no open belts or exposed pulleys, drive being accomplished through a fully enclosed, safe, motor chain. All speed changes are obtained through two levers at the front of the headstock—no removal or insertion of separate gears is necessary and it is impossible to jam the gears by locking in two speeds simultaneously.

Starting and stopping of the lathe itself is independent of motor control and is accomplished by a friction drive controlled by a lever within easy reach. All feeds and threads are controlled by two levers on the quick change box and one sliding on the quick change tumbler shaft. It is absolutely impossible to engage both lead screw and feed shaft at the same time.

The lathe itself is carefully protected against damage due to carelessness or overload. It is the heaviest machine of its size built and in addition it is provided with a safety shear pin at the end of the quick change box. This pin will shear under dangerous overload before any damage can be done to the lathe itself.

Safety should be a dominating feature of every school machine, and we honestly believe there is no safer lathe than the SEBASTIAN Gold Seal.

Gold Seal SEBASTIAN LATHES GUARANTEED CORRECT

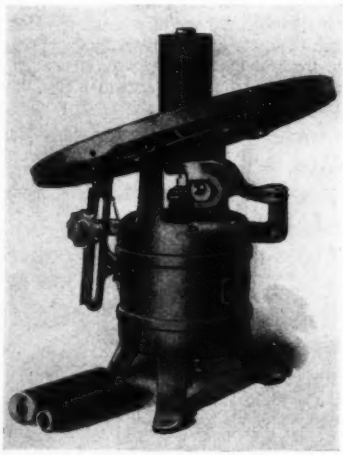
THE SEBASTIAN LATHE CO.
CINCINNATI, OHIO
New York Office—Room 372—50 Church Street

School Shop Equipment News

For the Supervisor and Teacher who desires to keep abreast with news of new Machinery, Tools, Supplies, etc.

PORTER-CABLE COMPANY TAKES OVER MANUFACTURE OF SYRACUSE BENCH SPINDLE SANDER

The Porter-Cable Machine Company, of Syracuse, N. Y., has purchased and will continue to manufacture the former Emmert spindle sander under the name of the Syracuse bench spindle sander, type O–E. This machine was designed



to reduce the cost on circular work, cam patterns, and gear cover work, and will perform in one tenth of the time required for hand gouging about 90 per cent of the irregular work on wood patterns. It will be found useful on small core-box patterns, since it eliminates the necessity of laying out the work on both sides of the piece and does away with all hand gouging and handwork.

The Syracuse bench spindle sander has a table which tilts one way 25 degrees and in another direction 20 degrees to allow for ample draft on patterns. It has an oscillating movement of the spindle, which removes all traces of sandpaper marks and insures a neatly finished job. Angles are obtained quickly by means of a graduated scale in front of the machine and the rolls may be removed and replaced without loss of time. The machine is light, portable, and may be used in any part of the shop.

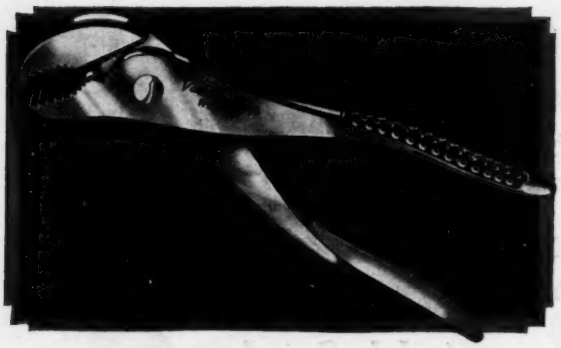
THE USE AND CARE OF SAWS

The E. C. Atkins Company, of Indianapolis, Ind., has issued a new booklet, entitled "Saws in the Filing Room," which offers practical suggestions and rules governing the use and care of circular saws.

The booklet gives suggestions for hanging and lining a saw, truing on the mandrel, hammering and tension, as well as instructions for ordering saws, determining the speed of saws, hints on the fitting or dressing saws, and instructions for the care of inserted tooth saws, wide and narrow band saws, band-saw brazing, and combination crosscut and rip-saws.

In addition to the text, there are a number of tables, including a table of strain for band saws, a table of solid-tooth circular saws, a table of weights of endless rubber bands for saw wheels, a table of repairs for solid-tooth circular saws, specifications for grinders, and pulley outside boxes.

(Continued on Page 34a)



Vacuum Grip Angle-Nose Grippers. An outstanding example of Vacuum Grip tool designing skill. Most powerful gripping pliers made. The 45° angle nose gets into the hard-to-reach places. Adjustable slide joint takes work up to ¾ in. Useful in a hundred ways. No. 107—length 7 in. Heavy nickel finish.

What student will not do better work with "better tools"?

SO carefully designed are Vacuum Grip Pliers—so skilfully fashioned to take care of certain specific jobs—that the student quickly recognizes them as "better tools" and responds by doing better work. An equipment of Vacuum Grip Pliers in the classroom is in itself a stimulus to manual dexterity and professional efficiency.

The painstaking effort expended on Vacuum Grip design is carried into every detail of manufacture. The steel used in these "super pliers" is our own analysis Silico-Molybdenum alloy tool steel, hardened by special liquid heat process and electrically and oil-tempered *thru and thru*. Little wonder that they outlast—three and four times—ordinary pliers made of cheap open hearth steel that is *merely surface hardened (case hardened)!*

A noticeable economy—due to their remarkably long life—invariably results, wherever Vacuum Grip Pliers are used.

Electricians' Side-Cutting Pliers

Flat nose, with curve in jaws for nuts and round objects. Many uses. Full fashioned handles.

No. 78—8 in.
No. 77—7 in.
No. 76—6 in.
No. 75—5 in.

Electricians' Diagonal Cutters

For all fine wire cutting jobs; very powerful; cutters remain permanently aligned.

No. 186—6 in.
No. 185—5 in.

Mechanic's Heavy Duty Pattern

No. 87 —7 in.
No. 86 —6 in.
No. 85 —5 in.

TO SUPERVISORS: Many valuable shop helps are suggested in our catalog, showing over 40 patterns and sizes. We will gladly send you a copy on request. When writing ask for prices of patterns illustrated, in lots of one dozen or less.

FORGED STEEL PRODUCTS CO.
Newport, Pa.

Vacuum Grip REG. U. S. PAT. OFF. **Pliers**

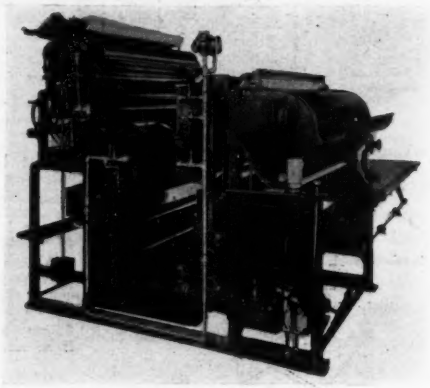
BUILT UP TO A STANDARD NOT DOWN TO A PRICE

USED AND ENDORSED BY LEADING MANUAL TRAINING SCHOOLS

(Continued from Page 33a)

A NEW BLUE-PRINTING MACHINE

The C. F. Pease Company, of 813–821 N. Franklin St., Chicago, Ill., call attention to their new blue-print machines which produce prints at the rate of 12 ft. per minute. While this is primarily a production machine, nevertheless the new Peerless Model "30" continuous blue-printing machine is interesting to both instructors and pupils in school drafting rooms. The new model is direct gear driven throughout, and has a variable speed range from 4 in. to 12 ft. per minute. It has a low and a high speed, a neutral and a reverse. This reverse which is a new departure, permits the operator to withdraw tracings or to run back the leader roll whenever that is desirable.



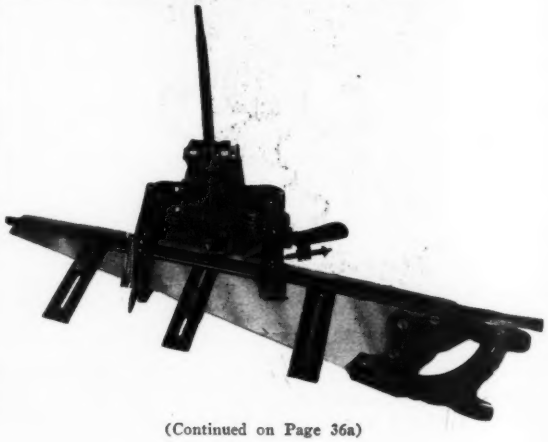
A hand-operated rheostat permits the instant changing of the printing speed so that the character of the tracing which is being printed can be accommodated instantly.

The washing of the prints is accomplished by means of pressure jets which cause water to spray over both front and back of the paper, thus removing the chemicals in the paper in a very efficient manner. The potash solution is put on the print with a rubber-covered roll after which the prints are again washed by another spray arrangement. The drying is accomplished by passing the paper directly over heated rolls, thus drying them perfectly smooth and free of wrinkles.

The Model "30" is made in 42-in. and 54-in. size, either 110 or 220 volts d.c. or 220 volts a.c. may be used. The 42-in. machine has six lamps and the 54-in. machine, 7 lamps.

FOLEY RETOOTHER FOR HANDSAWS

A great deal of time and effort are sometimes necessary to recondition saws which have broken or uneven teeth. To put the saw into perfect condition, all the teeth must be made uniform in size, height, and spacing. Formerly, it was necessary to file the teeth until they were even, or to grind them off and file new teeth. Both of these processes are slow and it is almost impossible to obtain a perfectly accurate job.



(Continued on Page 36a)

Built to stand years of hard use

Shops that put in Maydoles know from experience and comparison that they outlast ordinary hammers, reduce replacements and help the budget to go farther.

Heads press-forged from a high grade of tool steel, handles carefully shaped from clear, second growth hickory that has been air dried for years, - - balance, strength and a stubborn resistance to wear are built in.

Try Maydoles in your shop, your dealer can supply you with the styles and weights you need. Write us for a free supply of Pocket Handbooks 23 "H" containing tables and information which your students will find useful.

YOUR HAMMER SINCE 1843

Maydole Hammers

The David Maydole Hammer Co. - - Norwich, New York

3050

Kewaunee

An installation of 40 Kewaunee Manifold Desks

These Desks Save Room!

Manifold Desk No. M-3025

Much room can be saved and more pupils accommodated in your present buildings by equipping part-time rooms with furniture that makes them available for all periods of the day.

Kewaunee Manifold Desks

make the manual training room available for use as an art room, mechanical drawing room, industrial arts room and even for general academic work.

This space-saving equipment is made for Kindergarten and Primary Grades, Elementary Schools, Junior High and Senior High Schools. We have a very interesting book which pictures the complete line of Manifold Desks and explains their adaptability to all schools, which we want you to have.

Write for Free Kewaunee Book

Just send us your name and address and tell us to send you the Kewaunee Book. We will then mail you absolutely free and postpaid a copy of this book that tells all about the Manifold Desks that are becoming so popular everywhere.

SEE OUR DATA IN BRUCE'S SPECIFICATION ANNUAL 1929 EDITION

Kewaunee Mfg. Co.
LABORATORY FURNITURE EXPERTS

ADRIAN FACTORY
C. G. CAMPBELL, Pres. and Gen. Mgr.

Designers and Manufacturers of Art and Mechanical Drawing Room Furniture for Schools and Colleges

1 End South Center St., ADRIAN, MICH.

Kewaunee

(Continued from Page 34a)

The Foley Saw Tool Company of Minneapolis, Minn., has just placed on the market the Foley retoother for handsaws, which makes it possible to retooth handsaws quickly, accurately, and at a very low cost. The average workman can retooth a 26-in handsaw in three minutes, and a miter-box saw may be retoothed in four minutes.

The Foley retoother for handsaws will be found helpful in the school shop, as it saves both time and labor in the saw-filing jobs. The machine pays for itself in time saved and in the increased amount of work which can be done.

NEW PAASCHE AIRBRUSH FOR SCHOOL ARTWORK

The Paasche Airbrush Company, 1909 Diversey Parkway, Chicago, Ill., has issued a new booklet B–26, illustrating and describing the use of the Paasche Airbrush for school artwork. The airbrush is adapted for minute detail work and

THIS ILLUSTRATION SHOWS HOW THE NEW IMPROVED TYPE OF PAASCHE AIR-RUBBING MACHINES FIND APPLICATION IN A MODERN RADIO PLANT

high quality art rendering, and operates on a principle which makes it possible to use the heaviest of colors on the finest work. It will produce stippled effects, from the finest to the coarsest, by means of the adjustment of the air blast.

Complete information may be obtained upon request.

MR. ROY L. MARTIN has been elected as head of the Smith-Hughes vocational department of the New Hope School, Corinth, Miss.

MR. E. M. WYATT, who has for the past two years been in charge of the commercial research work at the Burgess Laboratories, Madison, Wis., has accepted a position as director of the school shops in the West Technical High School, Cleveland, Ohio.

MR. F. D. LONG, of East Chicago, Ind., has been elected as instructor in electricity in the Pullman Free School of Manual Training at Pullman, Ill. MR. LESTER ASMUS will teach in the machine shop.

MR. A. G. JENSEN has been elected as instructor in agriculture in the high school at Concordia, Kans.

MR. J. N. JOHNSON, of Davenport, Iowa, has been elected as an instructor in the vocational school at Moline, Ill.

MR. J. L. PERRIN, of Salisbury, Mo., has been elected secretary-treasurer of the Missouri Vocational Agricultural Teachers for the ensuing year.

(Continued on Page 38a)

"Standardized"

DIETZGEN

Instruments

Absolute Standardization as obtained in Dietzgen Drawing Instruments is of extreme importance. It means that no member of a Dietzgen equipped class need ever work with any instrument that is not in the same perfect condition in which it left the factory. For the **Dietzgen Service Kit** of standardized replacement parts enables any instructor to repair, in less than five minutes, any damage caused by student carelessness.

Another standardization feature is the division of the Dietzgen line of Drawing Instruments into 10 definite grades corresponding to and exactly meeting the requirements of the different school drafting courses. These grades are not alone gradations of quality and price, but are rather the selection of exactly the type and style of instruments best suited to fulfill each definite requirement from elementary school to college and professional use.

Here is illustrated Universal Drawing Instrument Set No. 1057 C—a popular set for high school and vocational school use. The catalog pages in the background describe replacement parts and Dietzgen Service Kits.

The principal dealer in each city carries Dietzgen Drawing Instruments — or write to one of our branches for complete information.

Dietzgen makes 10 grades of instruments in two types:

Square or Trigonal Type

"Gem Union"
"Federal"
"Reliance"
"Scholar"

EUGENE DIETZGEN CO.

Enduring worth at reasonable cost

Chicago New York Philadelphia Washington
New Orleans Pittsburgh Milwaukee Los Angeles
San Francisco *Factory at Chicago*

DIETZGEN ESTABLISHED 1864

Manufacturers of Drafting and Surveying Supplies

Flat-round Type

"Excello"
"Champion"
"Universal"
"Dependo"
"Prep"
"Elementary"

Now Available

"The Greatest book of its kind ever produced for student or teacher in the wood working classes."

Hundreds of letters have come to us in response to the distribution of the Author's Edition of "The Book of Projects."

Teachers and students alike have been enthusiastic in their praise. What we thought was a good effort turned out to be something greater.

Thirty-three pages of projects with complete drawings—thirteen pages devoted to ornamentation—beautifully printed—text clear and simple to understand—

Truly a book that will raise the standard of vocational work in the school and home.

"It should be in the hands of every teacher and student for every day reference—"

Still a few copies left for complimentary distribution to teachers and heads of wood working instruction who write us on school stationery.

Priced at only one dollar for general distribution.

KLISE MANUFACTURING COMPANY

Grand Rapids Michigan.

(Continued from Page 36a)

MR. R. N. WALL, of Carrier, Okla., has been appointed as director of the vocational agriculture department at Ponca City. Mr. Wall succeeds E. E. Huff, who resigned.

MR. HOWARD TRUMBULL, of Huntsville, Ohio, has been elected as instructor in mechanical drawing and vocational subjects in the high school at Bellefontaine, Ohio.

MR. A. GORREL, of Mexico, Mo., has been elected president of the Missouri Vocational Agricultural Teachers' Association.

MR. C. J. HYSLUP, formerly assistant principal at Norfolk, Va., has become a member of the staff of the division of trade and industrial education for the state education department. In his new position, Mr. Hyslup will give assistance to the teachers and principals of junior and senior high schools in organizing and planning courses in industrial arts.

MR. W. A. HELLER, of DePere, Wis., has been appointed as instructor in advanced woodwork in the vocational school at Milwaukee.

MR. WILLIAM MARKEN, of St. Charles, Minn., has been elected instructor in manual training at Rushford.

MISS MARY HINDS has been appointed instructor in home-economics in the high school at Salem, Ind. Miss Hinds succeeds Miss Margaret Weybright.

MR. J. I. WILSON, of Calumet, Mich., has been appointed instructor in forging at Negaunee. MR. F. W. PAWLING, who formerly taught forging, will devote his entire time this year to the supervision of the machine shop.

NEWS AND NOTES

Demand for Qualified Men Teachers in the Industrial Arts

An increased demand on the part of the public schools of New York State for well-qualified men teachers of industrial arts, has resulted in an arrangement perfected by the Oswego Normal school and the Buffalo College for Teachers for offering a three-year training program, beginning with the fall term. Formerly, the course of study in these subjects was limited to two years.

The work in industrial arts will include instruction in general metal work, woodwork, electricity, printing, photography, mechanical drawing, leather work, pottery, and automobile mechanics. In addition to a broad training in science, mathematics, English, and social studies, the students will be given an opportunity at some time in their course to participate in ten weeks of practice teaching in some of the junior and senior high schools of the state.

New School Gets Vocational Grant

An appropriation of $28,590 for the organization of the Brooklyn Technical School for Girls at Brooklyn, N. Y., has been provided for in the financial estimates of the board of education. A staff of academic and technical teachers was included in the appropriation.

Smith-Hughes Courses at Arcadia, Ohio

The Arcadia and Vanlue Centralized High Schools at Arcadia, Ohio, have been given Smith-Hughes home-economics departments by the state. Five centralized schools in the county now have such departments, toward which federal and state governments contribute financially.

New Buildings for Teacher Colleges

The Texas state legislature has recently granted an appropriation of $200,000 for new buildings at Sul Ross Teachers' College and the East Texas Teachers' College.

Federal Bureau Offers Aid in Surveys

The Women's Bureau of the U. S. Department of Labor is offering assistance to private, state, or national organizations planning to conduct surveys in the field of women

(Continued on Page 40a)

PERFECT DRAWING PENCILS GIVE WINGS TO YOUR WORK

VENUS

The perfect drawing pencil

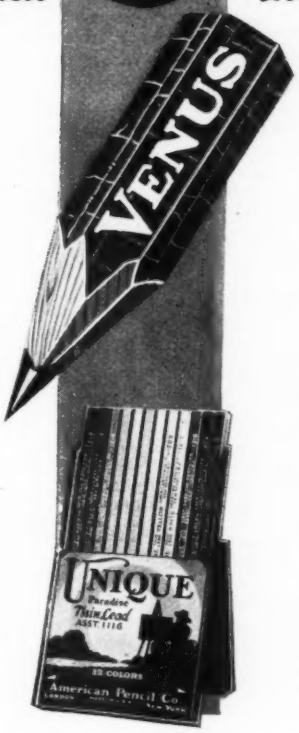
VENUS From the moment your knife cuts into the fine, straight-grained cedarwood of a VENUS pencil, you know that you are handling as fine a drawing tool as man ever made.

VENUS That conviction grows with every moment of its use—as the VENUS glides across the paper, smoothly and easily laying down a tone of airy gray or deepest black, and any subtle shading you desire.

VENUS Students who learn to draw with VENUS pencils start their training with an appreciation of the finest of fine drawing pencils.

17 shades of black, 3 indelible

Send **$1.00** for sample box of a dozen assorted styles



UNIQUE

TRADE MARK REGD.

thin-lead colored pencils

VENUS Schools all over the country have found UNIQUE Thin Lead Colored pencils to be the most versatile and welcome dry-color medium available.

VENUS Their wide range of 24 colors—really a complete palette in a form compact enough to slip into the pocket—makes UNIQUE a perfect sketching medium for both indoor and field work.

VENUS The needle point to which they can be sharpened makes them useful for fine-line drafting on any scale.

VENUS Teachers value UNIQUE pencils also for marking drawings with comment, criticisms, and corrections in color, as small and neat as though they were made in ink.

All primary shades and colors

	Per Box
12 colors (asst. 1116)	$1.00
24 pencils (asst. 1117)	$2.00

Sold Everywhere

AMERICAN PENCIL CO., 560 Venus Bldg., Hoboken, N. J.

We claim exclusive trade-mark rights to the word VENUS and the CRACKLED COAT on the pencils. Trade-mark registered U. S. Pat. Off. and foreign countries.

Sheldon Manual Training Benches

Built to Last a LIFETIME

Sheldon Manual Training Benches with their sturdy bolt re-enforced construction, dovetailed drawers, and edge grained tops are built to last a lifetime.

The fact that there are Sheldon benches still in use that were installed over 30 years ago is proof of every claim we make. When you buy Sheldon benches you can be sure that you are getting real value for your money, that you are buying benches that will cost you the least *per year of use.*

E. H. SHELDON & CO.,
30 Years Building Vocational Furniture
MUSKEGON, MICH.

(Continued from Page 38a)

workers. Among the ways in which the bureau lends a helping hand is in the assistance given in drawing up schedules and questionnaires to be used in an investigation or survey. Another method of giving aid is in the tabulation and analysis of data collected by organizations which have not the facilities or the experience for such work.

The bureau, through its broad experience and wide technical knowledge, serves as a valuable guide. It steers away from statistical pitfalls and blind alleys. It constructs a foundation for practical studies and for a safe and sound framework for the preparation of reports. It helps to standardize data and thus makes for uniformity in the collection and presentation of material, a service of great value to groups interested in the problems of women workers and desiring to make use of the available information on the subject.

The New Brooklyn Technical High School

The board of education of New York City has completed plans for the new Brooklyn Technical High School, which will be erected in Brooklyn, at a cost of approximately $7,000,000. The building which will be seven stories high, will be located on a site costing $1,203,000, and will provide accommodations for 5,000 students on a full-day program. The school is easily accessible by the ordinary transportation lines and will receive students from all boroughs of the city.

American Walnut Preferred for Construction of Fine Furniture

The monthly Summary of Foreign Commerce, published by the U. S. Department of Commerce, shows that a total of 13,119,000 board feet of American walnut was used in 1928 in the manufacture of fine furniture and cabinet pieces. Germany, England, Canada, Belgium, France, and other countries use large amounts of this wood. It is also used in the construction of sewing machines, music cabinets, telephone booths, interior finish, and wherever a durable wood with easy-working qualities is required.

Announce Simonds Economic Contest for 1929

The Simonds Saw and Steel Company, of Fitchburg, Mass., has announced the completion of plans for the economic contest of 1929. A first prize of $1,000, and a second prize of $500, will be awarded the winners of the contest on the subject, "The Federal Reserve System, and the Control of Credit." The contest closes on December 31, 1929.

High School Plans Vocational Guidance

The high school at Walla Walla, Wash., has proposed the establishment of a vocational-guidance bureau.

Trade-Training Annex for Haaren High School, New York

The board of education of New York City has proposed an addition to the Haaren High School, to cost $70,000. The addition will provide space for 3,000 students in the academic commercial courses. The old building will house the 900 students in the vocational courses.

New Buildings for Vocational Work at Naperville, Ill.

An appropriation of $50,000 has been made by the state for vocational buildings at the St. Charles School for Boys, Naperville, Ill. Construction work has been begun on a machine shop, a carpenter shop, a plumbing shop, and an electrical shop.

Cooperative School of Printing at Baltimore

A cooperative, year-round school of printing is being successfully operated at Baltimore, Md., as part of the vocational program of the schools. The school, which is named after Mergenthaler, the inventor of the linotype, offers instruction in the fundamentals of printing during the 48 weeks of the year. The school is the training center for the printing industry of Baltimore and employers regularly send compositors to the school for training in linotype work.

Vocational-Board Member Not Eligible as Director

Under a recent ruling of the attorney general of Wisconsin, a member of a local board of vocational education

(Continued on Page 43a)

(Continued from Page 40a)

in a city is not eligible to appointment by such board as the local director of vocational education.

Apprentices Sought by Master Painters

The International Association of Master Painters and Decorations has begun a campaign to raise a fund of $120,000 a year for three years, to encourage young men in vocational schools to become apprentices in the trade.

Hershey Industrial School Nearing Completion

The new Hershey Industrial School at Hershey, Pa., is nearing completion. The building which will house the industrial-training shops for the Hershey industrial department and the pupils of the Derry Township High School, will be completed at a cost of $250,000. It provides space for a number of shops, a large gymnasium, and additional classrooms.

Will Erect Vocational School at Green Bay, Wis.

The vocational school board at Green Bay, Wis., will erect a new building to house the students. The old building has been sold for an office site and the students have been moved to a commercial building until the new structure has been completed.

Vocational Education Consolidated with State Office

Under a new law passed by the legislature of Oklahoma, the department of vocational education has been consolidated with the state superintendent's office and will hereafter be under the direction of the state board. A reorganization of the office will take place in the near future.

Connecticut Trade Schools Adopt New Salary Schedule

The state board of education of Connecticut recently completed a study of the ten state trade schools, covering a period of eight years from 1920 to 1928, which brought out some pertinent facts regarding salaries of instructors. As a result of the study, the state board recommended a raising of the scale of salaries to command competent tradesmen and to hold the successful teachers. In connection with a reorganization, a new set of salaries has been adopted, which sets up four class specifications for trade-school instructors as follows: Junior instruction, senior instructor, department head, and director.

The schedule provides definite salaries for junior instructors and senior instructors in trade schools, department heads, and directors of trade schools. For junior instructors in trade schools, the range of salaries for men is from $1,800 to $2,520, with steps or increments of $120 each. For women, the salary scale is from $1,500 to $2,220, with increments of $120 each. For senior instructors in trade schools, the salary range is from $2,640 to $3,360, with increments of $120, and for women, $2,340 to $3,040, with increments of $120. Department heads receive $180 per year, in addition to their salaries as instructors. Directors of trade schools have a salary range of $3,300 to $4,500, with increments of $200 each.

The new salary rates enable Connecticut to retain her good instructors, and when new positions are to be filled, to attract first-class men, well prepared to teach, and masters of their trade as well.

New Vocational Building at Houston, Tex.

The school board of Houston, Tex., has awarded a contract for the erection of a vocational building, to cost $33,000.

Vocational Department of Pullman School Enlarged

The vocational department of the Pullman Free School of Manual Training, at Pullman, Ill., has been enlarged and expanded, and several new teachers have been added. Among the departments which have been enlarged and improved are the electrical, the automobile, and the machine departments.

New Vocational School in North Beaver Township, Pa.

Plans have been completed for the new vocational school, to be erected in North Beaver township, and to function jointly with the elementary and high school at Mt. Jackson, Pa. The school will offer courses in agriculture and vocational subjects.

New Agricultural Department at Ottawa, Kans.

A new building for the vocational agriculture department has been erected near the high school at Ottawa, Kans. The building has been equipped with forges, anvils, and tools for working in wood, metal, and leather.

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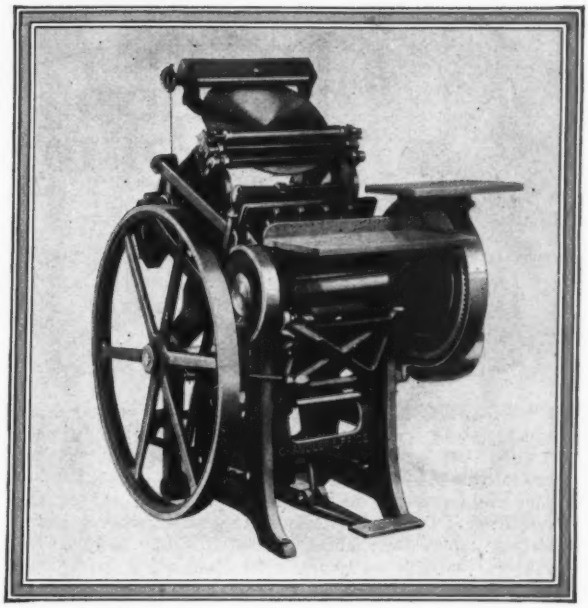
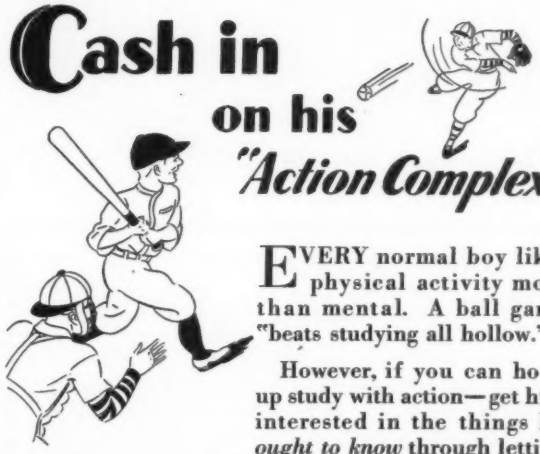


Cash in on his "Action Complex"



EVERY normal boy likes physical activity more than mental. A ball game "beats studying all hollow."

However, if you can hook up study with action—get him interested in the things he *ought to know* through letting him do things he *likes to do*—let him experience the practical, every day fruits of study—then you *can cash in on his action complex.*

Let us use this method to cultivate in him the principles of good taste and design; to ground in him the fundamentals of language and syntax and rhetoric; to instill in him a whole host of finer values, at which he might shy in the abstract.

The continuous increase of printing departments in our school system and of Chandler & Price installations in those departments is testimony to the fact that printing, directly and by indirection, serves an increasingly vital purpose in our schools. "Plenty of C & P Presses" is a good motto.

Chandler & Price
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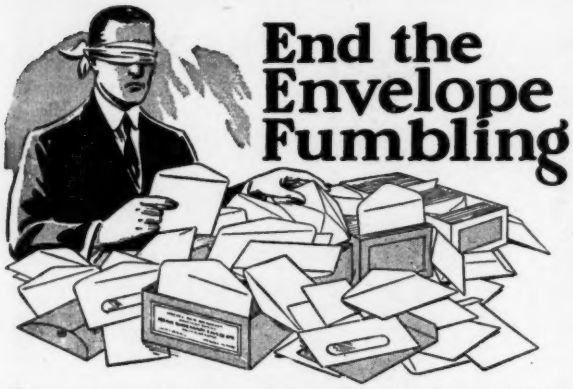
THE CHANDLER & PRICE COMPANY
Cleveland, Ohio, U. S. A.



End the Envelope Fumbling

IT'S NONSENSE . . groping around to find your desired specifications—maybe—in some distributor's supply list; than either putting up with something half right or waiting and wondering about results and delivery.

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Just what you need to hold the interest of every pupil — practical and substantial. Used in schools from coast to coast. Many schools have adopted lamps as a regular project in metal work and are ordering in large quantities.

Special offer now to introduce this practical fixture to additional manual training schools. One sample set will be sent to any manual arts instructor for only $2.45 postpaid, including four castings, bridge arm and pull chain socket. This offer is for cash only and good for only one set to a school. You may furnish your own pipe, wiring and finishing materials if you wish.

Directions for erection with each set. Easy to erect a lamp that would retail for $5.00 to $10.00 each.

Order a sample set now. If it is not what you want, return it at our expense. Your money will be refunded. If a junior floor lamp set is preferred (as illustrated at left), send only $2.15 for sample on same terms as above.

Midwest Lumber Company
Appleton, Wis.

Lumber Lamp and Shop Supplies Exclusively for Schools. Write for complete illustrated price circular free.

ONLY **$2.45** Postpaid

HARTFORD QUALITY CLAMPS

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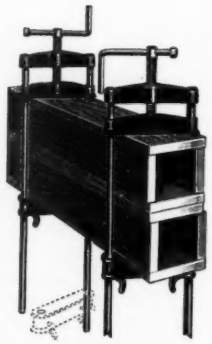
Better Projects



HARTFORD
Double Bar Clamps

The No. 6 Hartford Double Bar Clamp shown here is extra heavy and so strongly built that it does the work of a press on heavy work up to 6½ inches. The tail end is self-locking and unlocking and grips the heavy side bars so securely that there is never danger of slipping or springing.

Hartford Quality Clamps are available in every style and size. Send us a list of your requirements and we will quote.

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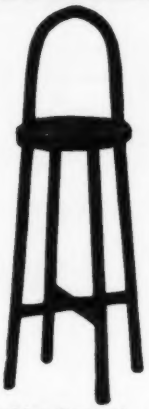
Sewing Stand No. 79
Shipping weight 10 lbs.
Price Complete Materials
$2.25



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Grand Rapids Fibre Cord Co. 609 Myrtle St. N. W. Grand Rapids, Mich.

(Continued from Page 43a)

Vocational Guidance at University of Southern California

A society for occupational research, working in cooperation with the committee on guidance and placement of the California-Nevada district, has been established at the University of Southern California, Los Angeles.

The plan provides for occupational exploration for students, covering a period of three years, with a period of counseling, training, and placement covering four to five years, including the senior high school and the junior college. The society has 29 members, and has for its president Mr. E. T. Robinson.

Teacher-Training Courses at Carnegie Institute

The Carnegie Institute of Technology is offering a variety of teacher-training courses in manual arts and industrial education for the benefit of teachers, supervisors, and administrators of manual-arts and industrial education who desire to take advantage of the work offered.

In order to meet a demand for a special type of teacher trained to teach industrial-arts subjects in the junior high school, the Institute has introduced a new four-year college course leading to the degree of bachelor of science in industrial education, and a two-year normal course. These courses are intended to provide sufficient training in shopwork to enable one to teach a general shop with five distinct activities. They also provide a broad, liberal education and in addition, include sufficient professional subjects to equip men for supervisory and administrative positions after a reasonable amount of experience.

In addition to the full-time day courses in teacher training, the Institute also offers in its night courses and part-time classes, a number of subjects arranged particularly for teachers of home economics, music, fine arts, and industrial and manual arts.

New Shops Installed at Harlandale, Tex.

A new junior-senior high-school plant, providing rooms for industrial arts and home economics, is being completed, at a cost of $230,000.

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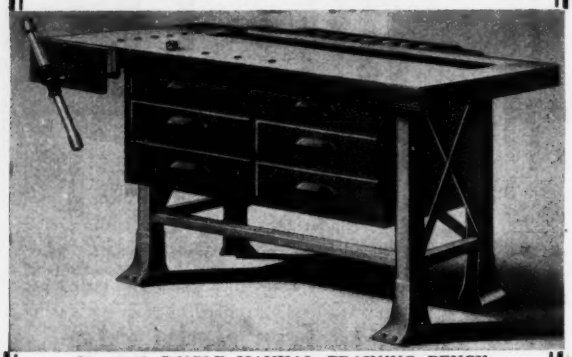

No. 9808 SINGLE MANUAL TRAINING BENCH

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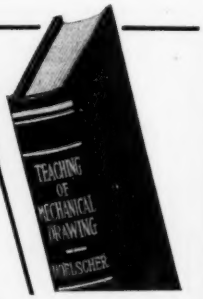

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BY

I. David Cohen, A.B., LL.B.

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